

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Notice of Intent

Type of Submission: Notice of Intent	Type of Action APD Change
Date Sundry Submitted: 02/21/2021	Time Sundry Submitted: 03:45
Date proposed operation will begin: 03/14/2021	

Procedure Description: Cimarex Energy respectfully requests approval to change BHL, target formation, casing design, and perform offline cementing for the Vaca Draw 20-17 Federal 11H well. Proposed BHL: 100' FNL & 2590' FEL Sec. 17, 25S, 33E Target formation: Bone Spring; Classification: Oil Offline Cmt Procedure: 7" Intermediate Casing 1. Land casing on solid body mandrel hanger 2. Engage pack-off and lock-ring 3. Install BPV 4. Skid rig 5. Check for pressure and remove BPV 6. Circulate down casing, taking returns through casing valves 7. Pump lead and tail cement 8. Displace cement and bump the plug 9. Ensure floats are holding pressure 10. RD cement crew 11. Install BPV and TA cap Please see attached previously approved detailed plan and diagram for review. Additional Attachments C102, BOP/Ck Manifold, Directional Plan, Drilling Plan, Multibowl WH, & OLC plan.

Application

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Section 1 - General

APD ID: 10400013702	Tie to previous NOS?	Submission Date:
BLM Office: CARLSBAD	User:	Title:
Federal/Indian APD: FED	Is the first lease penetrated for production Federal or Indian? FED	
Lease number: NMNM026394	Lease Acres:	
Surface access agreement in place?	Allotted?	Reservation:
Agreement in place? NO	Federal or Indian agreement:	
Agreement number:		
Agreement name:		
Keep application confidential? Y		
Permitting Agent? NO	APD Operator: CIMAREX ENERGY COMPANY	
Operator letter of designation:		

Operator Info

Operator Organization Name: CIMAREX ENERGY COMPANY		
Operator Address: 600 N MARIENFELD STREET ST SUITE 600		Zip: 79701
Operator PO Box:		
Operator City: MIDLAND	State: TX	
Operator Phone: (432)571-7800		
Operator Internet Address: tstathem@cimarex.com		

Section 2 - Well Information

Well in Master Development Plan? NO	Master Development Plan name:	
Well in Master SUPO? NO	Master SUPO name:	
Well in Master Drilling Plan? NO	Master Drilling Plan name:	
Well Name: VACA DRAW 20-17 FEDERAL	Well Number: 11H	Well API Number: 3002544357
Field/Pool or Exploratory? Field and Pool	Field Name: purple sage; wolfcamp (gas)	Pool Name: WILDCAT WOLFCAMP
Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL		
Is the proposed well in a Helium production area? N	Use Existing Well Pad? NO	New surface disturbance?
Type of Well Pad: MULTIPLE WELL	Multiple Well Pad Name: VACA Number: 2	
Well Class: HORIZONTAL	DRAW SUPER PAD Number of Legs: 1	
Well Work Type: Drill		
Well Type: CONVENTIONAL GAS WELL		
Describe Well Type:		

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Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 24 MilesDistance to nearest well: 20 FTDistance to lease line: 330 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: Vaca_Draw_20_17_Fed_11H_C102_Plat_05-05-2017.pdf

Well work start Date: 12/01/2017Duration: 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83Vertical Datum: NAVD88

Survey number:Reference Datum: GROUND LEVEL

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
SHL Leg #1	330	FSL	2030	FWL	25S	33E	20	Aliquot SESW	32.109742	-103.596292	LEA	NEW MEXICO	NEW MEXICO	F	NMNM026394	3417	0	0	Y
KOP Leg #1	229	FSL	2590	FWL	25S	33E	20	Aliquot SESW	32.109456	-103.594483	LEA	NEW MEXICO	NEW MEXICO	F	NMNM026394	-6820	10276	10237	Y
PPP Leg #1-1	333	FSL	2590	FWL	25S	33E	20	Aliquot SESW	32.109741	-103.594484	LEA	NEW MEXICO	NEW MEXICO	F	NMNM026394	-7118	10597	10535	Y
EXIT Leg #1	100	FNL	2590	FWL	25S	33E	17	Aliquot NENW	32.13758	-103.5944729	LEA	NEW MEXICO	NEW MEXICO	F	NMNM026394	-7298	20781	10715	Y

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Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
BHL Leg #1	100	FNL	2590	FWL	25S	33E	17	Aliquot NENW	32.13758	-103.5944729	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 026394	-7298	20781	10715	Y

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1613459	RUSTLER	3418	984	984		USEABLE WATER	N
1613463	SALADO	2290	1128	1128		NONE	N
1613455	CASTILE	-1269	4687	4687		NONE	N
1613456	BELL CANYON	-1538	4956	4956		NONE	N
1613461	CHERRY CANYON	-2556	5974	5974		NATURAL GAS, OIL	N
1613457	BRUSHY CANYON	-4066	7484	7484		NATURAL GAS, OIL	N
1613458	BONE SPRING	-5622	9040	9040		NATURAL GAS, OIL	N
1613462	BONE SPRING 2ND	-7155	10573	10573		NATURAL GAS, OIL	N
1613464	BONE SPRING 3RD	-8308	11726	11726		NATURAL GAS, OIL	N
1613460	WOLFCAMP	-8778	12196	12196		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M

Rating Depth: 11839

Equipment: Exhibit "E-1". A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached (Please see Exhibit F, F-1, F-2, F-3). The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

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Testing Procedure: A multi-bowl wellhead system will be utilized. After running the 10-3/4" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 10000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 10000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2. The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office. The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative. All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type. A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 10000 psi. The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater. The casing string utilizing steel body pack-off will be tested to 70% of casing burst. If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Choke Diagram Attachment:

Vaca_Draw_20_17_Fed_11H_Choke_10M_20171012113353.pdf

BOP Diagram Attachment:

Vaca_Draw_20_17_Fed_11H_BOP_10M_20171012113403.pdf

Pressure Rating (PSI): 5M **Rating Depth:** 1034

Equipment: Exhibit "E-1". A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached (Please see Exhibit F, F-1, F-2, F-3). The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

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Choke Diagram Attachment:

BOP Diagram Attachment:

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Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type
1	SURFACE	14.75	10.75	NEW	API	N	0	1034	0	1034	0	1034	1034	J-55	40.5	BUTT	3.34	6.62	BUOY	15.02	BUOY
2	PRODUCTION	6.75	5.5	NEW	API	N	0	11839	0	11839	0	11839	11839	L-80	20	LT&C	1.15	1.19	BUOY	1.87	BUOY
3	INTERMEDIATE	9.875	7.625	NEW	API	N	0	12463	0	12463	0	12463	12463	J-55	29.7	BUTT	2.48	1.2	BUOY	1.82	BUOY
4	PRODUCTION	6.75	5.0	NEW	API	N	11839	22197	11839	22197	11839	22197	10358	P-110	18	BUTT	1.67	16.9	BUOY	60.57	BUOY

Casing Attachments

Casing ID: 1String Type: SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_11H_Casing_Assumption_201710121113702.pdf

Casing ID: 2String Type: PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_11H_Casing_Assumption_201710121113855.pdf

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Casing Attachments

Casing ID: 3String Type:INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_11H_Casing_Assumption_20171012113817.pdf

Casing ID: 4String Type:PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_11H_Casing_Assumption_20171012113958.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	1034	402	1.72	13.5	690	50	Class C	Bentonite
SURFACE	Tail		0	1034	107	1.34	14.8	143	25	Class C	LCM
PRODUCTION	Lead		0	1183 9	733	1.3	14.2	952	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
INTERMEDIATE	Lead		0	1246 3	583	6.18	9.2	3602	50	Class C	Extender, Salt, Strength Enhancement, LCM, Fluid Loss, Retarder
INTERMEDIATE	Tail		0	1246 3	207	1.3	14.2	268	25	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS

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String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		1183 9	2219 7	733	1.3	14.2	952	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials will be kept on location at all times in order to combat lost circulation or unexpected kicks. In order to run DSTs, open hole logs, and casing, the viscosity and water loss may have to be adjusted in order to meet these needs.

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
1034	1246 3	OTHER : Brine Diesel Emulsion	8.5	9							
1246 3	2219 7	OIL-BASED MUD	12	12.5							
0	1034	SPUD MUD	8.3	8.8							

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Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

No DST Planned

List of open and cased hole logs run in the well:

CNL,DS,GR

Coring operation description for the well:

N/A

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 8041

Anticipated Surface Pressure: 5683

Anticipated Bottom Hole Temperature(F): 191

Anticipated abnormal pressures, temperatures, or potential geologic hazards? YES

Describe:

Lost circulation may be encountered in the Delaware mountain group. Abnormal pressure as well as hole stability issues may be encountered in the Wolfcamp.

Contingency Plans geoharzards description:

Lost circulation material will be available, as well as additional drilling fluid along with the fluid volume in the drilling rig pit system. Drilling fluid can be mixed on location or mixed in vendor mud plant and trucked to location if needed. Sufficient barite will be available to maintain appropriate mud weight for the Wolfcamp interval.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Vaca_Draw_20_17_Fed_11H_H2S_Plan_05-05-2017.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Vaca_Draw_20_17_Fed_11H_Directional_Plan_05-05-2017.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Vaca_Draw_20_17_Fed_11H_Drilling_Plan_20171012114410.pdf

Vaca_Draw_20_17_Fed_11H_Flex_Hose_20171012114414.pdf

Vaca_Draw_20_17_Fed_11H_AntiCollision_05-05-2017.pdf

Other Variance attachment:

SUPO

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Section 1 - Existing Roads

Will existing roads be used? NO

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Vaca_Draw_20_17_Fed_11H_Access_Road_ROW_05-05-2017.pdf

New road type: COLLECTOR

Length: 785	Feet	Width (ft.): 30
Max slope (%): 2		Max grade (%): 6

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 15

New road access erosion control: The side slopes of any drainage channels or swales that are crossed will be re-contoured to original grade and compacted and mulched as necessary to avoid erosion. Where steeper slopes cannot be avoided, water bars or silt fence will be constructed, mulch/rip-rap applied, or other measures employed as necessary to control erosion. Hay bales, straw waddles or silt fence may also be installed to control erosion as needed. All disturbed areas will be seeded with a mix appropriate for the area unless specified otherwise by the landowner.

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Turnout? N

Access surfacing type: GRAVEL

Access topsoil source: ONSITE

Access surfacing type description:

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Push off and stockpile alongside the location.

Access other construction information: The operator will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations or other events.

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	SURFACE CASING
	INTERMEDIATE/PRODUCTION CASING
Water source permit type:	WATER RIGHT
Permit Number:	
Water source transport method:	TRUCKING PIPELINE
Source land ownership: STATE	
Source transportation land ownership: STATE	
Water source volume (barrels): 5000	Source volume (acre-feet): 0.6444655
Source volume (gal): 210000	

Water source and transportation map:

Vaca_Draw_20_17_Fed_11H_Drlg_water_route_20170908121804.pdf

Water source comments:

New water well? NO

New Water Well Info

Well latitude:	Well Longitude:	Well datum:
Well target aquifer:		
Est. depth to top of aquifer(ft):	Est thickness of aquifer:	
Aquifer comments:		
Aquifer documentation:		
Well depth (ft):	Well casing type:	
Well casing outside diameter (in.):	Well casing inside diameter (in.):	
New water well casing?	Used casing source:	
Drilling method:	Drill material:	
Grout material:	Grout depth:	
Casing length (ft.):	Casing top depth (ft.):	
Well Production type:	Completion Method:	
Water well additional information:		
State appropriation permit:		
Additional information attachment:		

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Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: The drilling and testing operations will be conducted on a watered and compacted native soil grade. Soft spots will be covered with scoria, free of large rocks (3" diameter). Upon completion as a commercial producer the location will be covered with scoria, free of large rocks (3" dia.) from an existing privately owned gravel pit. Caliche will be sued form a pit located in Sec 3-26S-33E, per the Surface Use Agreement we are required to use this pit.

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations

Amount of waste: 32500 pounds

Waste disposal frequency : Weekly

Safe containment description: n/a

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Windmill Spraying Service hauls trash to Lea County Landfill

Waste type: DRILLING

Waste content description: Drilling Fluids, drill cuttings, water and other waste produced from the well during drilling operations.

Amount of waste: 15000 barrels

Waste disposal frequency : Weekly

Safe containment description: n/a

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Haul to R360 commercial Disposal

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.) Reserve pit width (ft.)

Reserve pit depth (ft.) Reserve pit volume (cu. yd.)

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? NO

Description of cuttings location

Cuttings area length (ft.)	Cuttings area width (ft.)
Cuttings area depth (ft.)	Cuttings area volume (cu. yd.)

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Vaca_Draw_20_17_Fed_11H_Wellsite_Layout_05-05-2017.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance	Multiple Well Pad Name: VACA DRAW SUPER PAD
	Multiple Well Pad Number: 2

Recontouring attachment:

Vaca_Draw_20_17_Fed_11H_Interim_Reclaim_05-05-2017.pdf

Drainage/Erosion control construction: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Drainage/Erosion control reclamation: All disturbed and re-contoured areas would be reseeded according to specifications. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Well pad proposed disturbance (acres):	Well pad interim reclamation (acres): 6.903	Well pad long term disturbance (acres): 6.903
Road proposed disturbance (acres):	Road interim reclamation (acres): 0.758	Road long term disturbance (acres): 0.758
Powerline proposed disturbance (acres):	Powerline interim reclamation (acres):	Powerline long term disturbance (acres):
Pipeline proposed disturbance (acres):	Pipeline interim reclamation (acres): 0.4275482	Pipeline long term disturbance (acres): 39.751377
Other proposed disturbance (acres):	Other interim reclamation (acres): 0	Other long term disturbance (acres):
Total proposed disturbance:	Total interim reclamation: 8.088549	4.367
		Total long term disturbance: 51.779377

Disturbance Comments: Gas Lift: 1,588', Flowline: 1,533', SWD: 40,426', Gas Pipeline: 14,172' Temp Fresh water Route: 3,104'

Reconstruction method: After well plugging, all disturbed areas would be returned to the original contour or a contour that blends with the surrounding landform including roads unless the surface owner requests that they be left intact. In consultation with the surface owners it will be determined if any gravel or similar materials used to reinforce an area are to be removed, buried, or left in place during final reclamation. Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated. As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, or fertilizing. Reclamation, Re-vegetation, and Drainage: All disturbed and re-contoured areas would be reseeded using techniques outlined under Phase I and II of this plan or as specified by the land owner. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage. **Topsoil redistribution:** Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated.

Soil treatment: As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching or fertilizing. **Existing Vegetation at the well pad:**

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

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Well Name: VACA DRAW 20-17
FEDERAL

Well Number: 11H

Lease Number: NMNM026394,
NMNM26394

US Well Number: 3002544357

Well Location: T25S / R33E / SEC 20 /
SESW / 32.109742 / -103.596292

Type of Well: CONVENTIONAL GAS
WELL

Unit or CA Name:

Well Status: Approved Application for
Permit to Drill

County or Parish/State: LEA /
NM

Allottee or Tribe Name:

Unit or CA Number:

Operator: CIMAREX ENERGY
COMPANY

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed Summary

Seed Type

Pounds/Acre

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name:

Last Name:

Phone:

Email:

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

Section 11 - Surface Ownership

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Disturbance type: WELL PAD

Describe:

Surface Owner:

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Section 12 - Other Information

Right of Way needed? YES

Use APD as ROW? YES

ROW Type(s): 281001 ROW - ROADS,285003 ROW – POWER TRANS,288100 ROW – O&G Pipeline,288101 ROW – O&G Facility Sites,288103 ROW – Salt Water Disposal Pipeline/Facility,288104 ROW – Salt Water Disposal ApIn/Fac-FLPMA,289001 ROW- O&G Well Pad,FLPMA (Powerline),Other

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite with BLM (Jeff Robertson) and Cimarex (Barry Hunt) on December 8, 2016. 500' X 560' pad (From #2H 190' north, 180' west, 370' south, 320' east). Top soil East. Interim reclamation: All sides. Access road from NW corner of pad, west, to the NE corner of the west pad. Vaca Draw 20-17 Federal off-site battery-Center: 1055 FSL & 1052 FWL, Section 20, T. 25 S., R. 33 E. (450' north/south X 400' east/west pad). Top soil west. Access road from SE corner, south to tie-in at proposed east/west road of Vaca Draw 20-17 Federal East half pad to west half pad.

Other SUPO Attachment

Vaca_Draw_20_17_Fed_11H_Gas_lift_Flow_line_ROW_05-05-2017.pdf

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Vaca_Draw_20_17_Fed_Battery_Road_ROW_05-05-2017.pdf
Vaca_Draw_20_17_Fed_11H_SUPO_05-05-2017.pdf
Vaca_Draw_20_17_Fed_Battery_SWD_ROW_05-05-2017.pdf
Vaca_Draw_20_17_Fed_11H_Public_Access_05-05-2017.pdf
Vaca_Draw_20_17_Fed_11H_Road_Description_05-05-2017.pdf
Vaca_Draw_20_17_Fed_11H_Temp_water_route_05-05-2017.pdf
Vaca_Draw_20_17_Fed_Battery_Gas_Sales_ROW_05-05-2017.pdf
Vaca_Draw_20_17_Fed_Battery_Powerline_ROW_05-05-2017.pdf

PWD

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD disturbance (acres): PWD surface owner:

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: Injection well name:

Assigned injection well API number? Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

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Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SESW / 32.109742 / -103.596292	County or Parish/State: LEA / NM
Well Number: 11H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Operator Certification

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME:	Signed on: 02/21/2021		
Title:			
Street Address:			
City:	State:	Zip:	
Phone:			
Email address:			

Field Representative

Representative Name:			
Street Address:			
City:	State:	Zip:	
Phone:			
Email address:			

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Lease Number: NMNM026394, NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 3002544357	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

NOI Attachments

Procedure Description

Vaca_Draw_2017_Fed_11H_Dir_Plan___AC_20210221153950.pdf

Vaca_Draw_20_17_Fed_11H_BOP_Manifolds___WH_20210221153907.pdf

OLC_7_in_Csg_Vaca_Draw_20210221153831.pdf

Drill_Plan_Vaca_Draw_20_17_Fed_11H_20210221153752.pdf

C102_Vaca_Draw_20_17_Fed_11H_20210221153730.pdf

Operator Certification

I certify that the foregoing is true and correct. Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction. Electronic submission of Sundry Notices through this system satisfies regulations requiring a submission of Form 3160-5 or a Sundry Notice.

Operator Electronic Signature: STATHEM	Signed on: FEB 21, 2021 03:40 PM
Name: CIMAREX ENERGY COMPANY	
Title: Mngr Regulatory Compliance	
Street Address: 600 N MARIENFELD STREET ST SUITE 600	
City: MIDLAND	State: TX
Phone: (432) 571-7800	
Email address: tstathem@cimarex.com	

Field Representative

Representative Name:		
Street Address:		
City:	State:	Zip:
Phone:		
Email address:		

BLM Point of Contact

BLM POC Name: CHRISTOPHER WALLS	BLM POC Title: Petroleum Engineer
BLM POC Phone: 5752342234	BLM POC Email Address: cwalls@blm.gov
Disposition: Approved	Disposition Date: 03/01/2021
Signature: Chris Walls	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-025-44357	² Pool Code 97903	³ Pool Name WC-025 G-08 S253235G; LOWER BONE SPRING
⁴ Property Code 319775	⁵ Property Name VACA DRAW 20-17 FEDERAL	⁶ Well Number 11H
⁷ OGRID No. 215099	⁸ Operator Name CIMAREX ENERGY CO.	⁹ Elevation 3417.0'

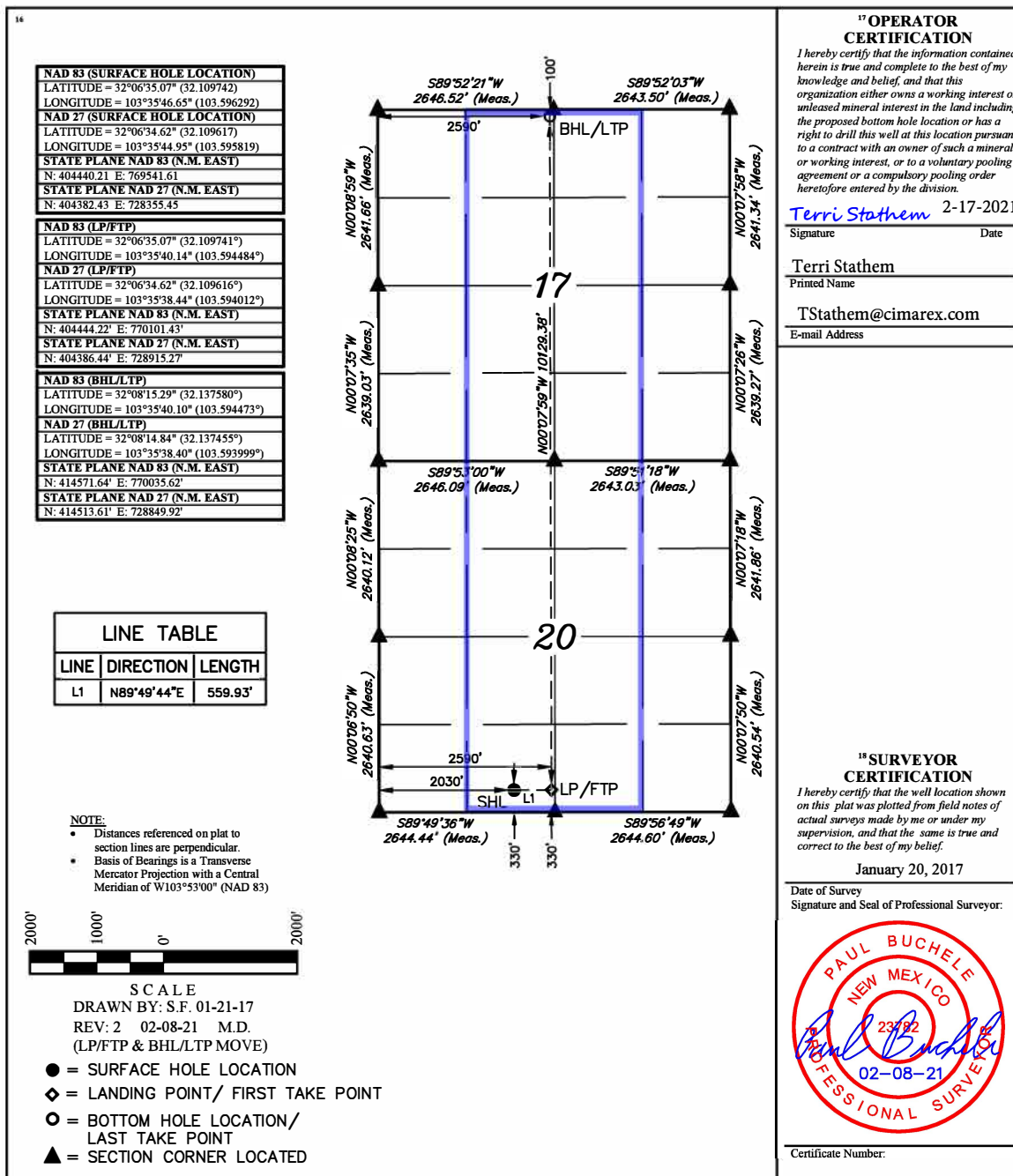
¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	20	25S	33E		330	SOUTH	2030	WEST	LEA

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
C	17	25S	33E		100	NORTH	2590	WEST	LEA
¹² Dedicated Acres 640	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.						

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



1. Geological Formations

TVD of target 10,715

Pilot Hole TD N/A

MD at TD 20,781

Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	984	N/A	
Salado	1128	N/A	
Castille	4687	N/A	
Bell Canyon	4956	N/A	
Cherry Canyon	5974	Hydrocarbons	
Brushy Canyon	7484	Hydrocarbons	
Bone Spring	9040	Hydrocarbons	
2nd Bone Spring Sand	10573	Hydrocarbons	
3rd Bone Spring Sand	11726	Hydrocarbons	
Wolfcamp	12196	Hydrocarbons	
Wolfcamp A1 Shale	12361	N/A	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	1050	1050	13-3/8"	48.00	H-40	ST&C	1.63	3.80	6.39
12 1/4	0	4920	4920	9-5/8"	40.00	HCK-55	LT&C	1.45	1.50	2.85
8 3/4	0	9376	9376	7"	26.00	L-80	LT&C	1.23	1.65	1.65
8 3/4	9376	10900	10698	7"	29.00	P-110	BT&C	1.70	2.24	24.23
6	9276	20781	10715	4-1/2"	11.60	P-110	BT&C	1.51	2.14	21.99
BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet

TVD was used on all calculations.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Cimarex Energy Co., Vaca Draw 20-17 Federal 11H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	N
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	N
Is 2nd string set 100' to 600' below the base of salt?	N
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	N
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	N
Is AC Report included?	N

3. Cementing Program

Casing	# Sk	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	509	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	136	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	932	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	284	14.80	1.36	6.57	9.5	Tail: Class C + Retarder
Production	341	10.30	3.64	22.18		Lead: Tuned Light + LCM
	104	14.80	1.36	6.57	9.5	Tail: Class C + Retarder
Completion System	734	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface	0	45
Intermediate	0	50
Production	4720	25
Completion System	10700	10

Cimarex request the ability to perform casing integrity tests after plug bump of cement job.

4. Pressure Control Equipment

A variance is requested for the use of a diverter on the surface casing. See attached for schematic.					
BOP installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
12 1/4	13 5/8	2M	Annular	X	100% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	3M	Annular	X	100% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	X	
			Other		
6	13 5/8	5M	Annular	X	100% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.				
X	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.				
	Y	Are anchors required by manufacturer?			

5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 1050'	Fresh Water	7.83 - 8.33	28	N/C
1050' to 4920'	Brine Water	9.80 - 10.30	30-32	N/C
4920' to 10900'	Cut Brine or OBM	8.50 - 9.00	27-70	N/C
11026' to 20781'	OBM	8.50 - 9.00	50-70	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing	
	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No logs are planned based on well control or offset log information.
	Drill stem test?
	Coring?

Additional Logs Planned	Interval
-------------------------	----------

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	5014 psi
Abnormal Temperature	No

Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

X	H ₂ S is present
X	H ₂ S plan is attached

8. Other Facets of Operation**9. Wellhead**

A multi-bowl wellhead system will be utilized.

After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 100% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office.

The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative.

All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

A solid steel body pack-off will be utilized after running and cementing the production casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

All casing strings will be tested as per Onshore Order No.2 to at least 0.22 psi/ft or 1,500 whichever is greater and not to exceed 70% of casing burst.

If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Drilling 12-1/4" hole
below 13 3/8" Casing

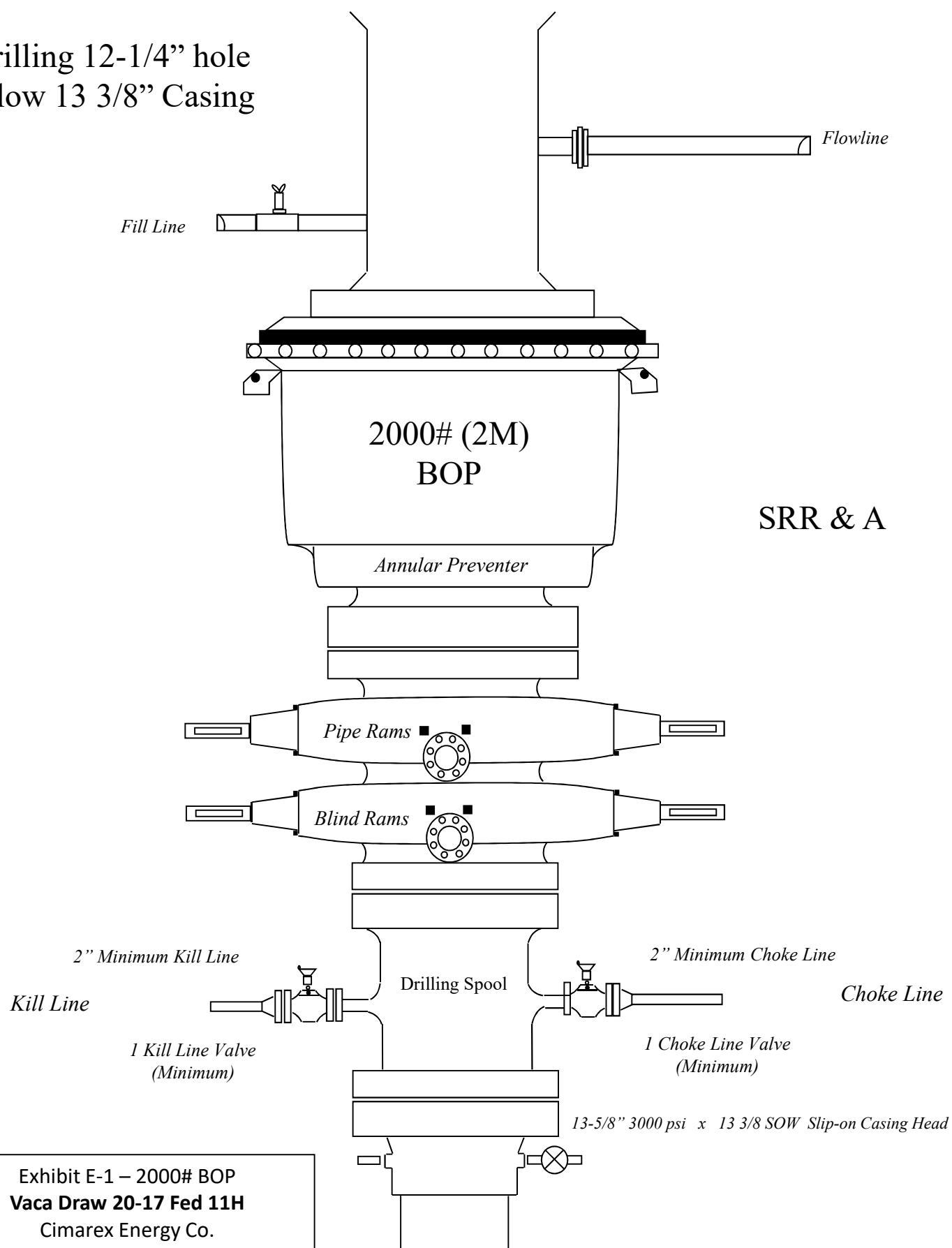


Exhibit E-1 – 2000# BOP
Vaca Draw 20-17 Fed 11H
Cimarex Energy Co.
20-25S-33E
Lea County, NM

Drilling 8-3/4" hole
below 9 5/8" Casing

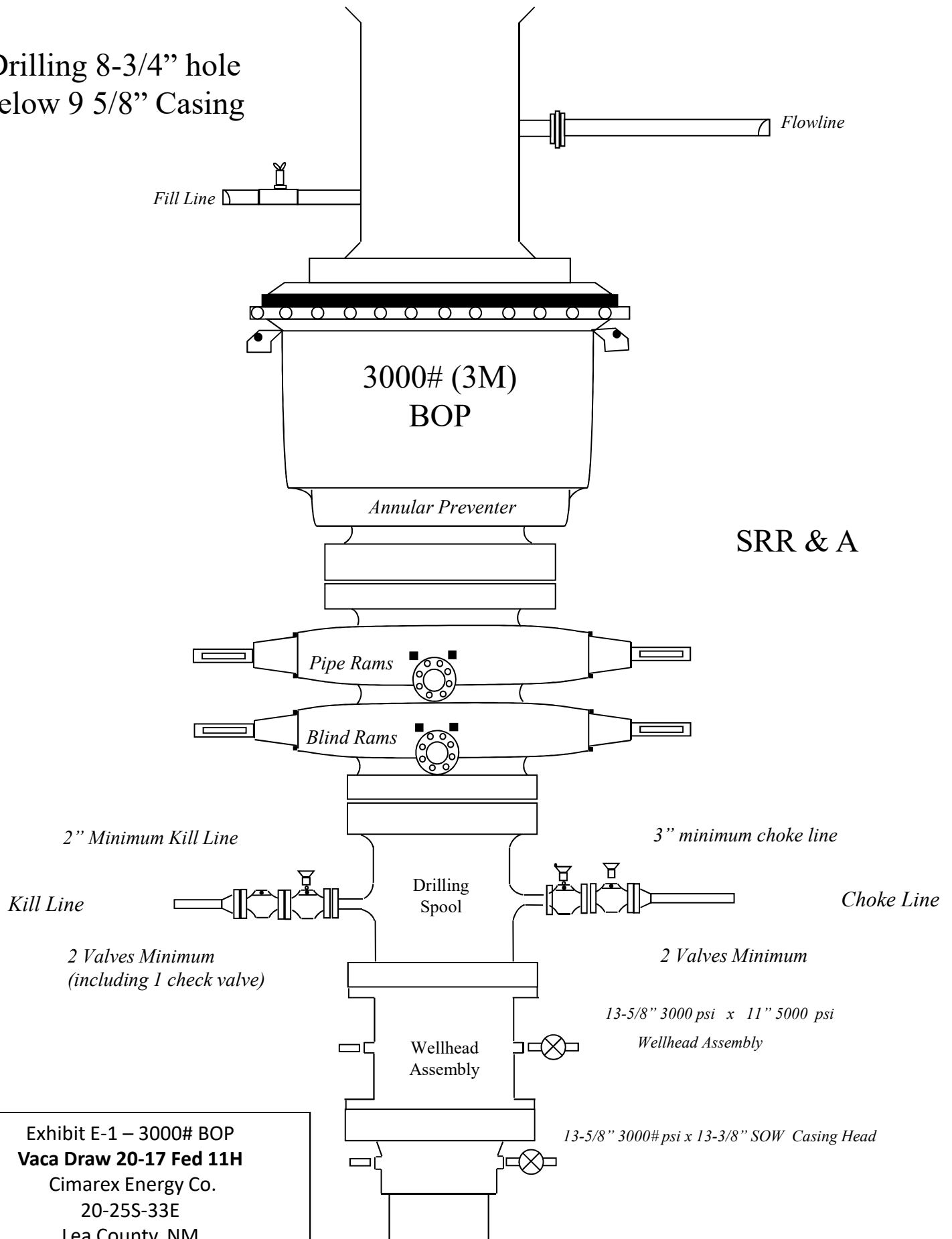


Exhibit E-1 – 3000# BOP
Vaca Draw 20-17 Fed 11H
Cimarex Energy Co.
20-25S-33E
Lea County, NM

Drilling 6" hole below
7" Casing

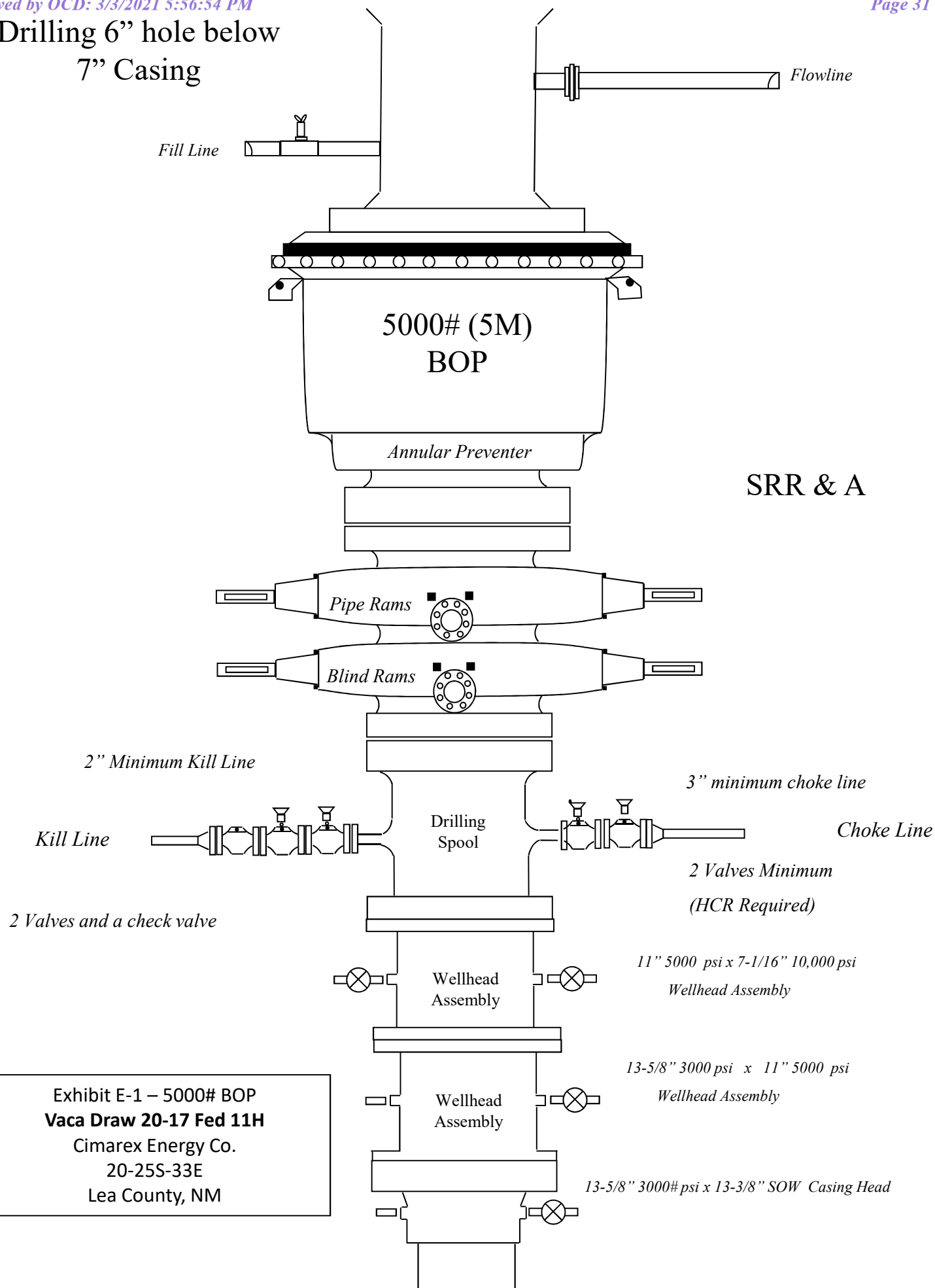


Exhibit E-1 – 5000# BOP
Vaca Draw 20-17 Fed 11H
Cimarex Energy Co.
20-25S-33E
Lea County, NM

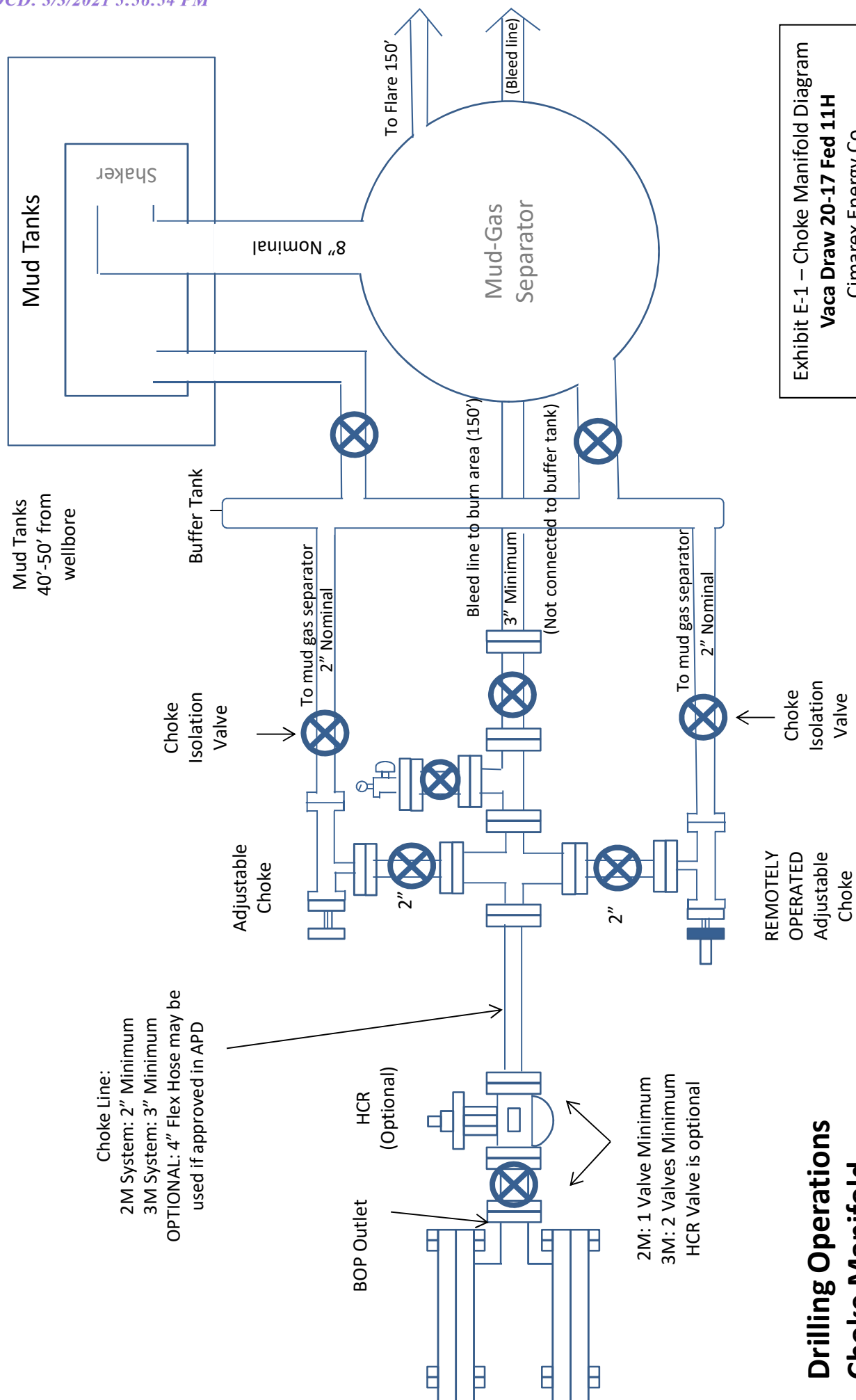
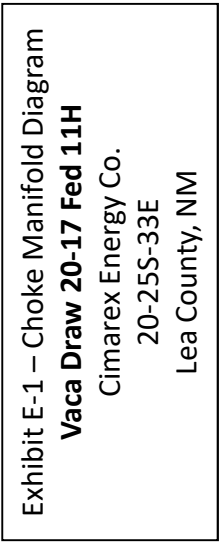
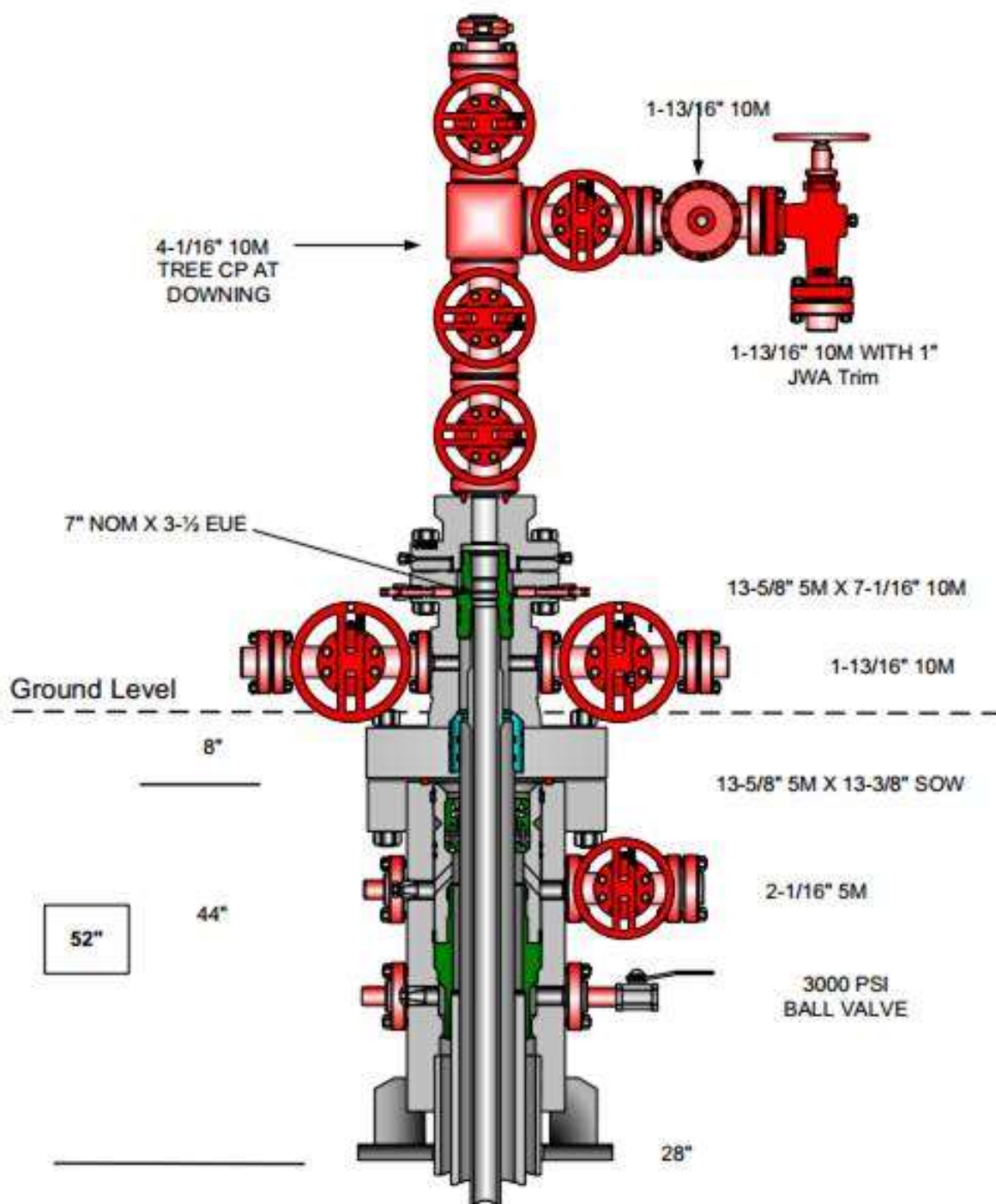


Exhibit E-1 – Choke Manifold Diagram
Vaca Draw 20-17 Fed 11H
 Cimarex Energy Co.
 20-25S-33E
 Lea County, NM

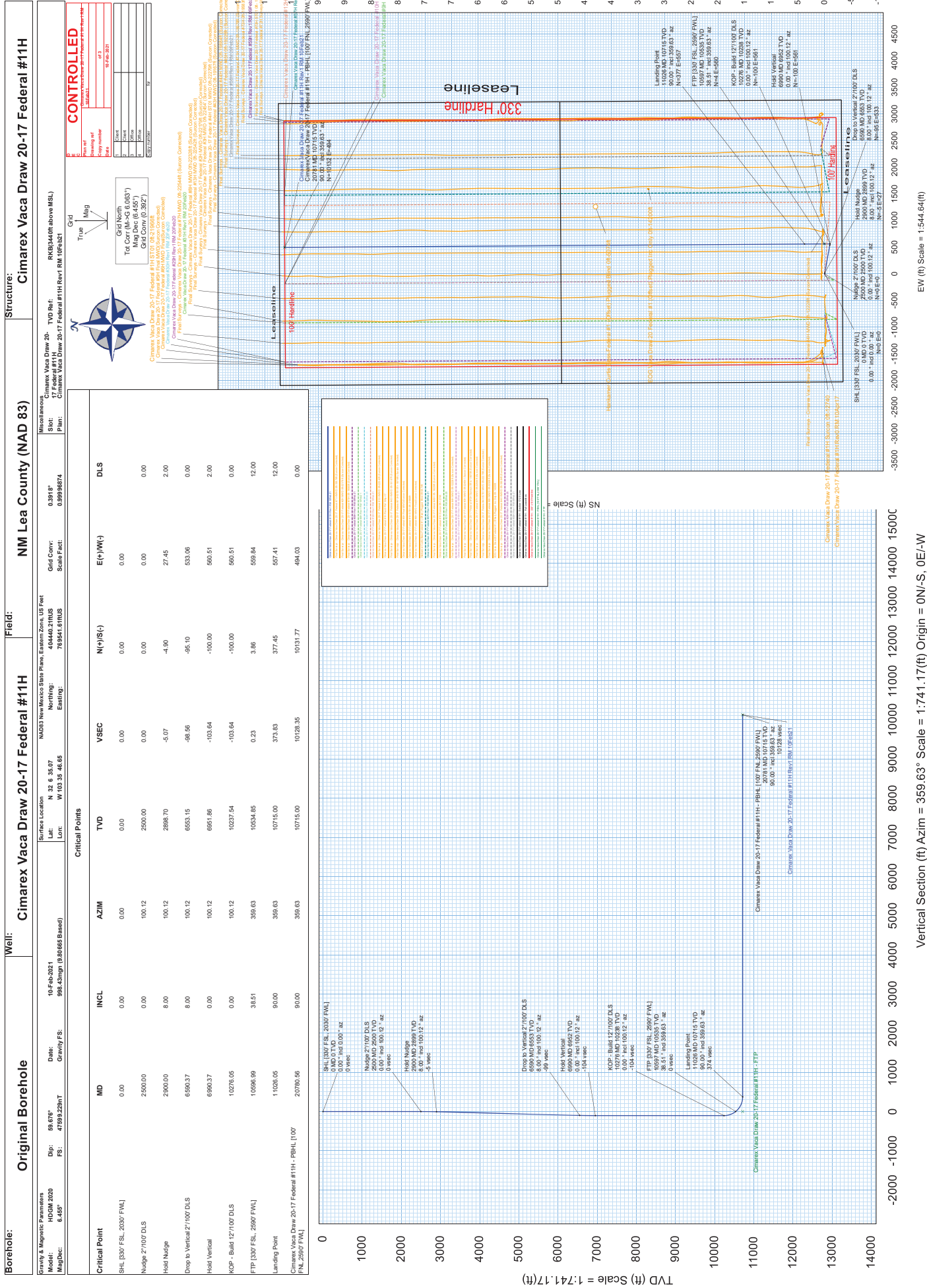
**Drilling Operations
 Choke Manifold
 2M/3M Service**



Multi-bowl Wellhead Diagram



Multi-bowl Wellhead Diagram
Vaca Draw 20-17 Fed 11H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM



Schlumberger**Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21 Proposal****Geodetic Report**

(Def Plan)



Report Date: February 10, 2021 - 01:20 PM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #11H / Cimarex Vaca Draw 20-17 Federal #11H
Well: Cimarex Vaca Draw 20-17 Federal #11H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21
Survey Date: February 10, 2021
Tort / AHD / DDI / ERD Ratio: 106.000 ° / 10801.344 ft / 6.346 / 1.008
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.06606", W 103° 35' 46.65261"
Location Grid N/E Y/X: N 404440.210 ftUS, E 769541.610 ftUS
CRS Grid Convergence Angle: 0.3918 °
Grid Scale Factor: 0.99996874
Version / Patch: 2.10.824.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.628 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3440.000 ft above MSL
Seabed / Ground Elevation: 3417.000 ft above MSL
Magnetic Declination: 6.455 °
Total Gravity Field Strength: 998.4305mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47599.229 nT
Magnetic Dip Angle: 59.676 °
Declination Date: February 10, 2021
Magnetic Declination Model: HDGM 2020
North Reference: Grid North
Grid Convergence Used: 0.3918 °
Total Corr Mag North-Grid North: 6.0633 °

Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [330' FSL, 2030' FWL] Nudge 2°/100' DLS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
Hold Nudge	2500.00	0.00	100.12	2500.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
Drop to Vertical 2°/100' DLS	2900.00	8.00	100.12	2898.70	-5.07	-4.90	27.45	2.00	404435.31	769569.06	N 32 6 35.02	W 103 35 46.33
Hold Vertical	6590.37	8.00	100.12	6553.15	-98.56	-95.10	533.06	0.00	404345.11	770074.66	N 32 6 34.09	W 103 35 40.46
KOP - Build	6990.37	0.00	100.12	6951.86	-103.64	-100.00	560.51	2.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
12°/100' DLS	10276.05	0.00	100.12	10237.54	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
Landing Point	11026.05	90.00	359.63	10715.00	373.83	377.45	557.41	12.00	404817.65	770099.00	N 32 6 38.76	W 103 35 40.14
Cimarex Vaca Draw 20-17	20780.56	90.00	359.63	10715.00	10128.35	10131.77	494.03	0.00	414571.64	770035.62	N 32 8 15.29	W 103 35 40.10
Federal #11H - PBHL [100' FNL, 2590' FWL]												

Survey Type: Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Description	Part		MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey		
	1		0.000	23.000	1/100.000	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21		
	1		23.000	20780.565	1/100.000	17.500	13.375	NAL_MWD_IFR1+MS	NAL_MWD_IFR1+MS	Original Borehole / Cimarex Vaca Draw 20-17 Federal #11H Rev1		

Schlumberger**Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21 Proposal****Geodetic Report**

(Def Plan)



Report Date: February 10, 2021 - 01:20 PM
Client: Cimarex
Field: NM Lea County (NAD 83)
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Well: Cimarex Vaca Draw 20-17 Federal #11H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
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Grid Scale Factor: 0.99996874
Version / Patch: 2.10.824.0

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Vertical Section Origin: 0.000 ft, 0.000 ft
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North Reference: Grid North
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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [330' FSL, 2030' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	100.00	0.00	100.12	100.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	200.00	0.00	100.12	200.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	300.00	0.00	100.12	300.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	400.00	0.00	100.12	400.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	500.00	0.00	100.12	500.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	600.00	0.00	100.12	600.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	700.00	0.00	100.12	700.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	800.00	0.00	100.12	800.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	900.00	0.00	100.12	900.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1000.00	0.00	100.12	1000.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1100.00	0.00	100.12	1100.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1200.00	0.00	100.12	1200.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1300.00	0.00	100.12	1300.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1400.00	0.00	100.12	1400.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1500.00	0.00	100.12	1500.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1600.00	0.00	100.12	1600.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1700.00	0.00	100.12	1700.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1800.00	0.00	100.12	1800.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	1900.00	0.00	100.12	1900.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	2000.00	0.00	100.12	2000.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	2100.00	0.00	100.12	2100.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	2200.00	0.00	100.12	2200.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	2300.00	0.00	100.12	2300.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Nudge 2°/100' DLS	2400.00	0.00	100.12	2400.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
	2500.00	0.00	100.12	2500.00	0.00	0.00	0.00	0.00	404440.21	769541.61	N 32 6 35.07	W 103 35 46.65
Hold Nudge	2600.00	2.00	100.12	2599.98	-0.32	-0.31	1.72	2.00	404439.90	769543.33	N 32 6 35.06	W 103 35 46.63
	2700.00	4.00	100.12	2699.84	-1.27	-1.23	6.87	2.00	404438.98	769548.48	N 32 6 35.05	W 103 35 46.57
	2800.00	6.00	100.12	2799.45	-2.86	-2.76	15.45	2.00	404437.45	769557.06	N 32 6 35.04	W 103 35 46.47
	2900.00	8.00	100.12	2898.70	-5.07	-4.90	27.45	2.00	404435.31	769569.06	N 32 6 35.02	W 103 35 46.33
	3000.00	8.00	100.12	2997.73	-7.61	-7.34	41.15	0.00	404432.87	769582.76	N 32 6 34.99	W 103 35 46.17
	3100.00	8.00	100.12	3096.76	-10.14	-9.79	54.85	0.00	404430.42	769596.46	N 32 6 34.97	W 103 35 46.02
	3200.00	8.00	100.12	3195.78	-12.67	-12.23	68.55	0.00	404427.98	769610.16	N 32 6 34.94	W 103 35 45.86
	3300.00	8.00	100.12	3294.81	-15.21	-14.67	82.25	0.00	404425.54	769623.86	N 32 6 34.92	W 103 35 45.70
	3400.00	8.00	100.12	3393.84	-17.74	-17.12	95.95	0.00	404423.09	769637.56	N 32 6 34.89	W 103 35 45.54
	3500.00	8.00	100.12	3492.86	-20.27	-19.56	109.65	0.00	404420.65	769651.26	N 32 6 34.87	W 103 35 45.38
	3600.00	8.00	100.12	3591.89	-22.81	-22.01	123.35	0.00	404418.20	769664.96	N 32 6 34.84	W 103 35 45.22
	3700.00	8.00	100.12	3690.92	-25.34	-24.45	137.05	0.00	404415.76	769678.66	N 32 6 34.81	W 103 35 45.06
	3800.00	8.00	100.12	3789.94	-27.87	-26.90	150.76	0.00	404413.31	769692.36	N 32 6 34.79	W 103 35 44.90
	3900.00	8.00	100.12	3888.97	-30.41	-29.34	164.46	0.00	404410.87	769706.06	N 32 6 34.76	W 103 35 44.74
	4000.00	8.00	100.12	3988.00	-32.94	-31.78	178.16	0.00	404408.43	769719.76	N 32 6 34.74	W 103 35 44.58
	4100.00	8.00	100.12	4087.02	-35.47	-34.23	191.86	0.00	404405.98	769733.46	N 32 6 34.71	W 103 35 44.42
	4200.00	8.00	100.12	4186.05	-38.01	-36.67	205.56	0.00	404403.54	769747.16	N 32 6 34.69	W 103 35 44.27
	4300.00	8.00	100.12	4285.08	-40.54	-39.12	219.26	0.00	404401.09	769760.86	N 32 6 34.66	W 103 35 44.11
	4400.00	8.00	100.12	4384.10	-43.07	-41.56	232.96	0.00	404398.65	769774.56	N 32 6 34.64	W 103 35 43.95
	4500.00	8.00	100.12	4483.13	-45.61	-44.01	246.66	0.00	404396.20	769788.26	N 32 6 34.61	W 103 35 43.79
Drop to Vertical 2°/100' DLS	4600.00	8.00	100.12	4582.16	-48.14	-46.45	260.36	0.00	404393.76	769801.96	N 32 6 34.59	W 103 35 43.63
	4700.00	8.00	100.12	4681.18	-50.67	-48.90	274.06	0.00	404391.32	769815.67	N 32 6 34.56	W 103 35 43.47
	4800.00	8.00	100.12	4780.21	-53.21	-51.34	287.77	0.00	404388.87	769829.37	N 32 6 34.54	W 103 35 43.31
	4900.00	8.00	100.12	4879.24	-55.74	-53.78	301.47	0.00	404386.43	769843.07	N 32 6 34.51	W 103 35 43.15
	5000.00	8.00	100.12	4978.26	-58.27	-56.23	315.17	0.00	404383.98	769856.77	N 32 6 34.49	W 103 35 42.99
	5100.00	8.00	100.12	5077.29	-60.81	-58.67	328.87	0.00	404381.54	769870.47	N 32 6 34.46	W 103 35 42.83
	5200.00	8.00	100.12	5176.32	-63.34	-61.12	342.57	0.00	404379.09	769884.17	N 32 6 34.44	W 103 35 42.67
	5300.00	8.00	100.12	5275.34	-65.87	-63.56	356.27	0.00	404376.65	769897.87	N 32 6 34.41	W 103 35 42.52
	5400.00	8.00	100.12	5374.37	-68.41	-66.01	369.97	0.00	404374.21	769911.57	N 32 6 34.39	W 103 35 42.36
	5500.00	8.00	100.12	5473.40	-70.94	-68.45	383.67	0.00	404371.76	769925.27	N 32 6 34.36	W 103 35 42.20
	5600.00	8.00	100.12	5572.43	-73.47	-70.89	397.37	0.00	404369.32	769938.97	N 32 6 34.34	W 103 35 42.04
	5700.00	8.00	100.12	5671.45	-76.01	-73.34	411.07	0.00	404366.87	769952.67	N 32 6 34.31	W 103 35 41.88
	5800.00	8.00	100.12	5770.48	-78.54	-75.78	424.78	0.00	404364.43	769966.37	N 32 6 34.29	W 103 35 41.72
	5900.00	8.00	100.12	5869.51	-81.07	-78.23	438.48	0.00	404361.98	769980.07	N 32 6 34.26	W 103 35 41.56
	6000.00	8.00	100.12	5968.53	-83.61	-80.67	452.18	0.00	404359.54	769993.77	N 32 6 34.24	W 103 35 41.40
	6100.00	8.00	100.12	6067.56	-86.14	-83.12	465.88	0.00	404357.10	770007.47	N 32 6 34.21	W 103 35 41.24
	6200.00	8.00	100.12	6166.59	-88.67	-85.56	479.58	0.00	404354.65	770021.17	N 32 6 34.19	W 103 35 41.08
	6300.00	8.00	100.12	6265.61	-91.21	-88.01	493.28	0.00	404352.21	770034.87	N 32 6 34.16	W 103 35 40.92
	6400.00	8.00	100.12	6364.64	-93.74	-90.45	506.98	0.00	404349.76	770048.57	N 32 6 34.14	W 103 35 40.77
Hold Vertical	6500.00	8.00	100.12	6463.67	-96.27	-92.89	520.68	0.00	404347.32	770062.28	N 32 6 34.11	W 103 35 40.61
	6590.37	8.00	100.12	6553.15	-98.56	-95.10	533.06	0.00	404345.11	770074.66	N 32 6 34.09	W 103 35 40.46
Drop to Vertical 2°/100' DLS	6600.00	7.81	100.12	6562.70	-98.80	-95.34	534.37	2.00	404344.88	770075.96	N 32 6 34.09	W 103 35 40.45
	6700.00	5.81	100.12	6661.99	-100.96	-97.42	546.04	2.00	404342.80	770087.63	N 32 6 34.07	W 103 35 40.31
	6800.00	3.81	100.12	6761.63	-102.49	-98.89	554.29	2.00	404341.32	770095.88	N 32 6 34.05	W 103 35 40.22
	6900.00	1.81	100.12	6861.50	-103.38	-99.75	559.11	2.00	404340.46	770100.70	N 32 6 34.04	W 103 35 40.16
	6990.37	0.00	100.12	6951.86	-103.64	-100.00	560.51	2.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7000.00	0.00	100.12	6961.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7100.00	0.00	100.12	7061.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7200.00	0.00	100.12	7161.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7300.00	0.00	100.12	7261.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7400.00	0.00	100.12	7361.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7500.00	0.00	100.12	7461.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
KOP - Build 12"/100' DLS	7600.00	0.00	100.12	7561.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7700.00	0.00	100.12	7661.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7800.00	0.00	100.12	7761.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	7900.00	0.00	100.12	7861.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8000.00	0.00	100.12	7961.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8100.00	0.00	100.12	8061.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8200.00	0.00	100.12	8161.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8300.00	0.00	100.12	8261.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8400.00	0.00	100.12	8361.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8500.00	0.00	100.12	8461.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8600.00	0.00	100.12	8561.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8700.00	0.00	100.12	8661.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8800.00	0.00	100.12	8761.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	8900.00	0.00	100.12	8861.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9000.00	0.00	100.12	8961.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9100.00	0.00	100.12	9061.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9200.00	0.00	100.12	9161.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9300.00	0.00	100.12	9261.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9400.00	0.00	100.12	9361.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9500.00	0.00	100.12	9461.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	9600.00	0.00	100.12	9561.49	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
FTP [330' FSL, 2590' FWL]	10276.05	0.00	100.12	10237.54	-103.64	-100.00	560.51	0.00	404340.21	770102.10	N 32 6 34.04	W 103 35 40.14
	10300.00	2.87	359.63	10261.48	-103.04	-99.40	560.51	12.00	404340.81	770102.10	N 32 6 34.04	W 103 35 40.14
Landing Point	10400.00	14.87	359.63	10360.10	-87.64	-84.00	560.41	12.00	404356.21	770102.00	N 32 6 34.20	W 103 35 40.14
	10500.00	26.87	359.63	10453.37	-52.07	-48.43	560.17	12.00	404391.78	770101.77	N 32 6 34.55	W 103 35 40.14
	10596.99	38.51	359.63	10534.85	0.23	3.86	559.84	12.00	404444.07	770101.43	N 32 6 35.07	W 103 35 40.14
	10600.00	38.87	359.63	10537.20	2.11	5.74	559.82	12.00	404445.95	770101.41	N 32 6 35.08	W 103 35 40.14
	10700.00	50.87	359.63	10607.94	72.54	76.17	559.37	12.00	404516.38	770100.96	N 32 6 35.78	W 103 35 40.14
	10800.00	62.87	359.63	10662.48	156.13	159.76	558.82	12.00	404599.97	770100.41	N 32 6 36.61	W 103 35 40.14
	10900.00	74.87	359.63	10698.46	249.24	252.87	558.22	12.00	404693.07	770099.81	N 32 6 37.53	W 103 35 40.14
	11000.00	86.87	359.63	10714.29	347.79	351.42	557.58	12.00	404791.62	770099.17	N 32 6 38.51	W 103 35 40.14
	11026.05	90.00	359.63	10715.00	373.83	377.45	557.41	12.00	404817.65	770099.00	N 32 6 38.76	W 103 35 40.14
	11100.00	90.00	359.63	10715.00	447.78	451.41	556.93	0.00	404891.60	770098.52	N 32 6 39.50	W 103 35 40.14
	11200.00	90.00	359.63	10715.00	547.78	551.40	556.28	0.00	404991.60	770097.87	N 32 6 40.48	W 103 35 40.14
	11300.00	90.00	359.63	10715.00	647.78	651.40	555.63	0.00	405091.59	770097.22	N 32 6 41.47	W 103 35 40.14
	11400.00	90.00	359.63	10715.00	747.78	751.40	554.98	0.00	405191.59	770096.57	N 32 6 42.46	W 103 35 40.14
	11500.00	90.00	359.63	10715.00	847.78	851.40	553.33	0.00	405291.58	770095.92	N 32 6 43.45	W 103 35 40.14
	11600.00	90.00	359.63	10715.00	947.78	951.40	553.68	0.00	405391.57	770095.27	N 32 6 44.44	W 103 35 40.14
	11700.00	90.00	359.63	10715.00	1047.78	1051.39	553.03	0.00	405491.57	770094.62	N 32 6 45.43	W 103 35 40.14
	11800.00	90.00	359.63	10715.00	1147.78	1151.39	552.38	0.00	405591.56	770093.97	N 32 6 46.42	W 103 35 40.14
	11900.00	90.00	359.63	10715.00	1247.78	1251.39	551.73	0.00	405691.56	770093.32	N 32 6 47.41	W 103 35 40.14
	12000.00	90.00	359.63	10715.00	1347.78	1351.39	551.08	0.00	405791.55	770092.67	N 32 6 48.40	W 103 35 40.14
	12100.00	90.00	359.63	10715.00	1447.78	1451.39	550.43	0.00	405891.55	770092.02	N 32 6 49.39	W 103 35 40.14
	12200.00	90.00	359.63	10715.00	1547.78	1551.38	549.78	0.00	405991.54	770091.37	N 32 6 50.38	W 103 35 40.14
	12300.00	90.00	359.63	10715.00	1647.78	1651.38	549.13	0.00	406091.54	770090.72	N 32 6 51.37	W 103 35 40.14
	12400.00	90.00	359.63	10715.00	1747.78	1751.38	548.48	0.00	406191.53	770090.07	N 32 6 52.36	W 103 35 40.14
	12500.00	90.00	359.63	10715.00	1847.78	1851.38	547.83	0.00	406291.53	770089.42	N 32 6 53.35	W 103 35 40.14
	12600.00	90.00	359.63	10715.00	1947.78	1951.37	547.18	0.00	406391.52	770088.77	N 32 6 54.34	W 103 35 40.14

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	12700.00	90.00	359.63	10715.00	2047.78	2051.37	546.53	0.00	406491.51	770088.12	N 32° 6' 55.33"	W 103° 35' 40.14"
	12800.00	90.00	359.63	10715.00	2147.78	2151.37	545.88	0.00	406591.51	770087.47	N 32° 6' 56.32"	W 103° 35' 40.13"
	12900.00	90.00	359.63	10715.00	2247.78	2251.37	545.23	0.00	406691.50	770086.82	N 32° 6' 57.31"	W 103° 35' 40.13"
	13000.00	90.00	359.63	10715.00	2347.78	2351.37	544.58	0.00	406791.50	770086.17	N 32° 6' 58.30"	W 103° 35' 40.13"
	13100.00	90.00	359.63	10715.00	2447.78	2451.36	543.93	0.00	406891.49	770085.52	N 32° 6' 59.29"	W 103° 35' 40.13"
	13200.00	90.00	359.63	10715.00	2547.78	2551.36	543.28	0.00	406991.49	770084.87	N 32° 7' 0' 28"	W 103° 35' 40.13"
	13300.00	90.00	359.63	10715.00	2647.78	2651.36	542.63	0.00	407091.48	770084.22	N 32° 7' 1' 26"	W 103° 35' 40.13"
	13400.00	90.00	359.63	10715.00	2747.78	2751.36	541.98	0.00	407191.48	770083.57	N 32° 7' 2' 25"	W 103° 35' 40.13"
	13500.00	90.00	359.63	10715.00	2847.78	2851.36	541.33	0.00	407291.47	770082.92	N 32° 7' 3' 24"	W 103° 35' 40.13"
	13600.00	90.00	359.63	10715.00	2947.78	2951.35	540.68	0.00	407391.47	770082.28	N 32° 7' 4' 23"	W 103° 35' 40.13"
	13700.00	90.00	359.63	10715.00	3047.78	3051.35	540.03	0.00	407491.46	770081.63	N 32° 7' 5' 22"	W 103° 35' 40.13"
	13800.00	90.00	359.63	10715.00	3147.78	3151.35	539.38	0.00	407591.45	770080.98	N 32° 7' 6' 21"	W 103° 35' 40.13"
	13900.00	90.00	359.63	10715.00	3247.78	3251.35	538.73	0.00	407691.45	770080.33	N 32° 7' 7' 20"	W 103° 35' 40.13"
	14000.00	90.00	359.63	10715.00	3347.78	3351.35	538.08	0.00	407791.44	770079.68	N 32° 7' 8' 19"	W 103° 35' 40.13"
	14100.00	90.00	359.63	10715.00	3447.78	3451.34	537.43	0.00	407891.44	770079.03	N 32° 7' 9' 18"	W 103° 35' 40.13"
	14200.00	90.00	359.63	10715.00	3547.78	3551.34	536.78	0.00	407991.43	770078.38	N 32° 7' 10' 17"	W 103° 35' 40.13"
	14300.00	90.00	359.63	10715.00	3647.78	3651.34	536.13	0.00	408091.43	770077.73	N 32° 7' 11' 16"	W 103° 35' 40.13"
	14400.00	90.00	359.63	10715.00	3747.78	3751.34	535.48	0.00	408191.42	770077.08	N 32° 7' 12' 15"	W 103° 35' 40.13"
	14500.00	90.00	359.63	10715.00	3847.78	3851.33	534.84	0.00	408291.42	770076.43	N 32° 7' 13' 14"	W 103° 35' 40.13"
	14600.00	90.00	359.63	10715.00	3947.78	3951.33	534.19	0.00	408391.41	770075.78	N 32° 7' 14' 13"	W 103° 35' 40.13"
	14700.00	90.00	359.63	10715.00	4047.78	4051.33	533.54	0.00	408491.41	770075.13	N 32° 7' 15' 12"	W 103° 35' 40.13"
	14800.00	90.00	359.63	10715.00	4147.78	4151.33	532.89	0.00	408591.40	770074.48	N 32° 7' 16' 11"	W 103° 35' 40.13"
	14900.00	90.00	359.63	10715.00	4247.78	4251.33	532.24	0.00	408691.39	770073.83	N 32° 7' 17' 10"	W 103° 35' 40.13"
	15000.00	90.00	359.63	10715.00	4347.78	4351.32	531.59	0.00	408791.39	770073.18	N 32° 7' 18' 09"	W 103° 35' 40.13"
	15100.00	90.00	359.63	10715.00	4447.78	4451.32	530.94	0.00	408891.38	770072.53	N 32° 7' 19' 08"	W 103° 35' 40.13"
	15200.00	90.00	359.63	10715.00	4547.78	4551.32	530.29	0.00	408991.38	770071.88	N 32° 7' 20' 07"	W 103° 35' 40.12"
	15300.00	90.00	359.63	10715.00	4647.78	4651.32	529.64	0.00	409091.37	770071.23	N 32° 7' 21' 06"	W 103° 35' 40.12"
	15400.00	90.00	359.63	10715.00	4747.78	4751.32	528.99	0.00	409191.37	770070.58	N 32° 7' 22' 04"	W 103° 35' 40.12"
	15500.00	90.00	359.63	10715.00	4847.78	4851.31	528.34	0.00	409291.36	770069.93	N 32° 7' 23' 03"	W 103° 35' 40.12"
	15600.00	90.00	359.63	10715.00	4947.78	4951.31	527.69	0.00	409391.36	770069.28	N 32° 7' 24' 02"	W 103° 35' 40.12"
	15700.00	90.00	359.63	10715.00	5047.78	5051.31	527.04	0.00	409491.35	770068.63	N 32° 7' 25' 01"	W 103° 35' 40.12"
	15800.00	90.00	359.63	10715.00	5147.78	5151.31	526.39	0.00	409591.35	770067.98	N 32° 7' 26' 00"	W 103° 35' 40.12"
	15900.00	90.00	359.63	10715.00	5247.78	5251.31	525.74	0.00	409691.34	770067.33	N 32° 7' 26' 99"	W 103° 35' 40.12"
	16000.00	90.00	359.63	10715.00	5347.78	5351.30	525.09	0.00	409791.34	770066.68	N 32° 7' 27' 98"	W 103° 35' 40.12"
	16100.00	90.00	359.63	10715.00	5447.78	5451.30	524.44	0.00	409891.33	770066.03	N 32° 7' 28' 97"	W 103° 35' 40.12"
	16200.00	90.00	359.63	10715.00	5547.78	5551.30	523.79	0.00	409991.32	770065.38	N 32° 7' 29' 96"	W 103° 35' 40.12"
	16300.00	90.00	359.63	10715.00	5647.78	5651.30	523.14	0.00	410091.32	770064.73	N 32° 7' 30' 95"	W 103° 35' 40.12"
	16400.00	90.00	359.63	10715.00	5747.78	5751.29	522.49	0.00	410191.31	770064.08	N 32° 7' 31' 94"	W 103° 35' 40.12"
	16500.00	90.00	359.63	10715.00	5847.78	5851.29	521.84	0.00	410291.31	770063.43	N 32° 7' 32' 93"	W 103° 35' 40.12"
	16600.00	90.00	359.63	10715.00	5947.78	5951.29	521.19	0.00	410391.30	770062.78	N 32° 7' 33' 92"	W 103° 35' 40.12"
	16700.00	90.00	359.63	10715.00	6047.78	6051.29	520.54	0.00	410491.30	770062.13	N 32° 7' 34' 91"	W 103° 35' 40.12"
	16800.00	90.00	359.63	10715.00	6147.78	6151.29	519.89	0.00	410591.29	770061.48	N 32° 7' 35' 90"	W 103° 35' 40.12"
	16900.00	90.00	359.63	10715.00	6247.78	6251.28	519.24	0.00	410691.29	770060.83	N 32° 7' 36' 89"	W 103° 35' 40.12"
	17000.00	90.00	359.63	10715.00	6347.78	6351.28	518.59	0.00	410791.28	770060.18	N 32° 7' 37' 88"	W 103° 35' 40.12"
	17100.00	90.00	359.63	10715.00	6447.78	6451.28	517.94	0.00	410891.28	770059.53	N 32° 7' 38' 87"	W 103° 35' 40.12"
	17200.00	90.00	359.63	10715.00	6547.78	6551.28	517.29	0.00	410991.27	770058.88	N 32° 7' 39' 86"	W 103° 35' 40.12"
	17300.00	90.00	359.63	10715.00	6647.78	6651.28	516.64	0.00	411091.26	770058.23	N 32° 7' 40' 85"	W 103° 35' 40.12"
	17400.00	90.00	359.63	10715.00	6747.78	6751.27	515.99	0.00	411191.26	770057.58	N 32° 7' 41' 84"	W 103° 35' 40.12"
	17500.00	90.00	359.63	10715.00	6847.78	6851.27	515.34	0.00	411291.25	770056.94	N 32° 7' 42' 82"	W 103° 35' 40.12"
	17600.00	90.00	359.63	10715.00	6947.78	6951.27	514.69	0.00	411391.25	770056.29	N 32° 7' 43' 81"	W 103° 35' 40.11"
	17700.00	90.00	359.63	10715.00	7047.78	7051.27	514.04	0.00	411491.24	770055.64	N 32° 7' 44' 80"	W 103° 35' 40.11"
	17800.00	90.00	359.63	10715.00	7147.78	7151.27	513.39	0.00	411591.24	770054.99	N 32° 7' 45' 79"	W 103° 35' 40.11"
	17900.00	90.00	359.63	10715.00	7247.78	7251.26	512.74	0.00	411691.23	770054.34	N 32° 7' 46' 78"	W 103° 35' 40.11"
	18000.00	90.00	359.63	10715.00	7347.78	7351.26	512.09	0.00	411791.23	770053.69	N 32° 7' 47' 77"	W 103° 35' 40.11"
	18100.00	90.00	359.63	10715.00	7447.78	7451.26	511.44	0.00	411891.22	770053.04	N 32° 7' 48' 76"	W 103° 35' 40.11"
	18200.00	90.00	359.63	10715.00	7547.78	7551.26	510.79	0.00	411991.22	770052.39	N 32° 7' 49' 75"	W 103° 35' 40.11"

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	18300.00	90.00	359.63	10715.00	7647.78	7651.25	510.14	0.00	412091.21	770051.74	N 32 7 50.74	W 103 35 40.11
	18400.00	90.00	359.63	10715.00	7747.78	7751.25	509.49	0.00	412191.20	770051.09	N 32 7 51.73	W 103 35 40.11
	18500.00	90.00	359.63	10715.00	7847.78	7851.25	508.84	0.00	412291.20	770050.44	N 32 7 52.72	W 103 35 40.11
	18600.00	90.00	359.63	10715.00	7947.78	7951.25	508.19	0.00	412391.19	770049.79	N 32 7 53.71	W 103 35 40.11
	18700.00	90.00	359.63	10715.00	8047.78	8051.25	507.55	0.00	412491.19	770049.14	N 32 7 54.70	W 103 35 40.11
	18800.00	90.00	359.63	10715.00	8147.78	8151.24	506.90	0.00	412591.18	770048.49	N 32 7 55.69	W 103 35 40.11
	18900.00	90.00	359.63	10715.00	8247.78	8251.24	506.25	0.00	412691.18	770047.84	N 32 7 56.68	W 103 35 40.11
	19000.00	90.00	359.63	10715.00	8347.78	8351.24	505.60	0.00	412791.17	770047.19	N 32 7 57.67	W 103 35 40.11
	19100.00	90.00	359.63	10715.00	8447.78	8451.24	504.95	0.00	412891.17	770046.54	N 32 7 58.66	W 103 35 40.11
	19200.00	90.00	359.63	10715.00	8547.78	8551.24	504.30	0.00	412991.16	770045.89	N 32 7 59.65	W 103 35 40.11
	19300.00	90.00	359.63	10715.00	8647.78	8651.23	503.65	0.00	413091.16	770045.24	N 32 8 0.64	W 103 35 40.11
	19400.00	90.00	359.63	10715.00	8747.78	8751.23	503.00	0.00	413191.15	770044.59	N 32 8 1.63	W 103 35 40.11
	19500.00	90.00	359.63	10715.00	8847.78	8851.23	502.35	0.00	413291.14	770043.94	N 32 8 2.62	W 103 35 40.11
	19600.00	90.00	359.63	10715.00	8947.78	8951.23	501.70	0.00	413391.14	770043.29	N 32 8 3.61	W 103 35 40.11
	19700.00	90.00	359.63	10715.00	9047.78	9051.23	501.05	0.00	413491.13	770042.64	N 32 8 4.59	W 103 35 40.11
	19800.00	90.00	359.63	10715.00	9147.78	9151.22	500.40	0.00	413591.13	770041.99	N 32 8 5.58	W 103 35 40.11
	19900.00	90.00	359.63	10715.00	9247.78	9251.22	499.75	0.00	413691.12	770041.34	N 32 8 6.57	W 103 35 40.11
	20000.00	90.00	359.63	10715.00	9347.78	9351.22	499.10	0.00	413791.12	770040.69	N 32 8 7.56	W 103 35 40.10
	20100.00	90.00	359.63	10715.00	9447.78	9451.22	498.45	0.00	413891.11	770040.04	N 32 8 8.55	W 103 35 40.10
	20200.00	90.00	359.63	10715.00	9547.78	9551.21	497.80	0.00	413991.11	770039.39	N 32 8 9.54	W 103 35 40.10
	20300.00	90.00	359.63	10715.00	9647.78	9651.21	497.15	0.00	414091.10	770038.74	N 32 8 10.53	W 103 35 40.10
	20400.00	90.00	359.63	10715.00	9747.78	9751.21	496.50	0.00	414191.10	770038.09	N 32 8 11.52	W 103 35 40.10
	20500.00	90.00	359.63	10715.00	9847.78	9851.21	495.85	0.00	414291.09	770037.44	N 32 8 12.51	W 103 35 40.10
	20600.00	90.00	359.63	10715.00	9947.78	9951.21	495.20	0.00	414391.09	770036.79	N 32 8 13.50	W 103 35 40.10
	20700.00	90.00	359.63	10715.00	10047.78	10051.20	494.55	0.00	414491.08	770036.14	N 32 8 14.49	W 103 35 40.10
Cimarex Vaca Draw 20-17												
Federal #11H - PBHL [100' FNL, 2590' FWL]	20780.56	90.00	359.63	10715.00	10128.35	10131.77	494.03	0.00	414571.64	770035.62	N 32 8 15.29	W 103 35 40.10

Survey Type: Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	23.000	1/100.000	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21
	1	23.000	20780.565	1/100.000	17.500	13.375	NAL_MWD_IFR1+MS	Original Borehole / Cimarex Vaca Draw 20-17 Federal #11H Rev1



Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21 Anti-Collision Summary Report

Analysis Date-24hr Time: February 10, 2021 - 13:20

Client: Cimarex

Field: NM Lea County (NAD 83)

Structure: Cimarex Vaca Draw 20-17 Federal #11H

Slot: Cimarex Vaca Draw 20-17 Federal #11H

Well: Cimarex Vaca Draw 20-17 Federal #11H

Borehole: Original Borehole

Scan MD Range: 0.00ft ~ 20780.56ft

Analysis Method:

Reference Trajectory:

Depth Interval:

Rule Set:

Min Pts:

Version / Patch:

Database \ Project:

3D Least Distance

Cimarex Vaca Draw 20-17 Federal #11H Rev1 RM 10Feb21 (Def Plan)

Every 10.00 Measured Depth (ft)

NAL Procedure: D&M AntiCollision Standard S002

All local minima indicated.

2.10.824.0

US1455VSM3115IDRILLING-NM Lea County 2.10

ISCWSA0 3-D 95.000% Confidence 2.7955 sigma, for subject well. For offset wells, error model version is specified with each well respectively.

Offset Trajectories Summary

Not performed!
Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans
Selection filters:
- All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Minor	Major		

Results highlighted: Sep-Factor separation <= 1.50 ft

Cimarex Vaca Draw 20-17
Federal #10H Rev1 RM
10Feb21 (Def Plan)

20.00	16.26	18.71	3.74	N/A	MAS = 4.96 (m)	0.00	0.00	0.00		Enter Alert	Fall Minor
20.00	16.26	18.71	3.74	84231.27	MAS = 4.96 (m)	23.00	23.00	23.00		WRP	
20.00	20.03	6.22	-0.03	1.50	OSF1.50	2050.00	2050.00	OSF<1.50		Enter Minor	
20.00	24.18	3.45	-4.18	1.23	OSF1.50	2490.00	2490.00			MinPt-CtCt	
20.00	24.27	3.39	-4.27	1.22	OSF1.50	2500.00	2500.00			MinPts	
24.31	24.46	7.57	-0.15	1.49	OSF1.50	2620.00	2619.96	OSF>1.50		Exit Minor	
68.26	23.47	52.18	44.79	4.53	OSF1.50	2900.00	2898.70			MinPts	
72.87	23.42	56.82	49.45	4.85	OSF1.50	2920.00	2918.51	OSF>5.00		Exit Alert	
683.10	68.63	636.91	614.46	15.19	OSF1.50	10080.00	10041.49			MINPT-O-EOU	
683.23	68.78	636.94	614.45	15.16	OSF1.50	10100.00	10061.49			MinPt-O-ADP	
686.43	69.59	639.60	616.83	15.05	OSF1.50	10230.00	10191.49			MinPt-O-SF	
747.96	68.28	702.01	679.68	16.72	OSF1.50	11040.00	10715.00			MinPt-CtCt	
747.96	225.47	597.22	522.49	5.00	OSF1.50	17110.00	10715.00	OSF<5.00		Enter Alert	
747.96	340.20	520.73	407.76	3.30	OSF1.50	20780.56	10715.00			MinPts	

Cimarex Vaca Draw 20-17
Federal #12H Rev1 RM
10Feb21 (Def Plan)

19.98	16.24	18.69	3.74	N/A	MAS = 4.95 (m)	0.00	0.00	0.00		Enter Alert	Warning Alert
19.98	16.24	18.69	3.74	N/A	MAS = 4.95 (m)	23.00	23.00			WRP	
19.98	19.56	6.51	0.42	1.53	OSF1.50	2000.00	2000.00			MinPt-CtCt	
20.00	19.63	6.48	0.37	1.53	OSF1.50	2010.00	2010.00			MINPT-O-EOU	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor		
	20.05	19.70	6.49	1.53	OSF1.50	2020.00	2020.00			MinPts	
	69.77	22.17	54.56	4.92	OSF1.50	2540.00	2540.00	OSF>5.00		Exit Alert	
	482.59	50.56	448.46	14.85	OSF1.50	8590.37	8553.15			MinPt-O-SF	
	784.02	66.96	738.95	17.88	OSF1.50	10370.00	10330.88			MINPT-O-EOU	
	784.11	67.07	738.97	17.85	OSF1.50	10390.00	10350.41			MinPt-O-ADP	
	788.11	67.86	742.44	17.73	OSF1.50	10550.00	10496.70			MinPt-O-SF	
	846.69	254.98	676.28	5.00	OSF1.50	18410.00	10715.00	OSF<5.00		Enter Alert	
	846.69	329.55	626.56	3.86	OSF1.50	20780.56	10715.00			MinPts	

Cimarex Vaca Draw 20-17
Federal #9H Rev1 RM
10Feb21 (Def Plan)

39.99	32.25	38.71	7.74	N/A	MAS = 9.83 (m)	0.00	0.00	CtCt<=15m<15.00		Enter Alert	Warning Alert
39.99	32.25	38.71	7.74	87104.16	MAS = 9.83 (m)	23.00	23.00			WRP	
39.99	32.25	26.59	7.74	3.19	MAS = 9.83 (m)	1990.00	1990.00			MinPts	
40.02	32.25	26.49	7.77	3.16	MAS = 9.83 (m)	2020.00	2020.00			MINPT-O-EOU	
	32.25	26.67	8.12	3.15	MAS = 9.83 (m)	2070.00	2070.00			MinPt-O-SF	
65.18	32.25	51.03	32.93	4.97	MAS = 9.83 (m)	2480.00	2480.00	OSF>5.00		Exit Alert	
128.91	32.25	115.32	96.66	10.37	MAS = 9.83 (m)	2900.00	2898.70			MinPts	
451.76	32.25	433.20	419.50	26.09	MAS = 9.83 (m)	4990.00	4968.36			MinPt-O-SF	
659.87	40.26	632.60	619.60	25.34	OSF1.50	6590.37	6553.15			MINPT-O-EOU	
686.63	65.80	642.33	620.83	15.94	OSF1.50	10300.00	10261.48			MinPt-O-SF	
686.69	65.88	642.34	620.81	15.92	OSF1.50	10310.00	10271.46			MINPT-O-ADP	
693.79	67.42	648.41	626.36	15.71	OSF1.50	10500.00	10453.37			MinPt-O-SF	
749.88	69.37	703.21	680.51	16.49	OSF1.50	11026.05	10715.00	OSF<5.00		Enter Alert	
749.89	226.04	598.77	523.85	5.00	OSF1.50	16890.00	10715.00			MinPts	
749.89	348.07	517.41	401.82	3.24	OSF1.50	20780.56	10715.00				

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #9H MWD
0ft-22454' (Surcon Corrected)
(Def Survey)

116.58	32.81	115.45	83.77	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	Warning Alert
116.57	32.81	115.44	83.76	24285.74	MAS = 10.00 (m)	23.00	23.00			WRP	
116.28	32.81	114.46	83.47	168.71	MAS = 10.00 (m)	190.00	190.00			MINPT-O-EOU	
115.90	32.81	113.58	83.09	88.94	MAS = 10.00 (m)	310.00	310.00			MinPts	
115.93	32.81	113.53	83.12	83.24	MAS = 10.00 (m)	330.00	330.00			MINPT-O-EOU	
117.77	32.81	110.07	84.97	17.46	MAS = 10.00 (m)	1540.00	1540.00			MinPts	
78.33	32.81	66.13	45.52	6.92	MAS = 10.00 (m)	2820.00	2819.33			MinPts	
78.33	32.81	66.12	45.52	6.92	MAS = 10.00 (m)	2830.00	2829.27			MinPts	
79.26	32.81	67.06	46.45	7.01	MAS = 10.00 (m)	2900.00	2898.70			MinPts	
177.40	32.81	162.60	144.59	12.80	MAS = 10.00 (m)	4550.00	4532.64			MinPt-O-SF	
325.95	33.15	303.51	292.80	15.17	OSF1.50	6590.37	6553.15			MinPt-O-SF	
194.47	41.55	166.44	152.93	7.16	OSF1.50	9251.49	9251.49			MINPT-CtCt	
194.59	41.89	166.32	152.69	7.10	OSF1.50	9360.00	9321.49			MINPT-O-EOU	
195.06	42.56	166.35	152.50	7.01	OSF1.50	9490.00	9451.49			MINPT-O-EOU	
195.19	42.72	166.37	152.48	6.99	OSF1.50	9520.00	9481.49			MinPt-O-ADP	
198.86	43.91	169.25	154.95	6.92	OSF1.50	9760.00	9721.49			MinPt-O-SF	
208.19	45.82	177.30	162.37	6.94	OSF1.50	10150.00	10111.49			MinPt-O-SF	
154.42	47.76	122.21	106.65	4.93	OSF1.50	10600.00	10537.20	OSF<5.00		Enter Alert	
145.59	48.18	113.13	97.41	4.60	OSF1.50	10680.00	10594.99			MinPts	
157.18	48.73	124.35	108.45	4.91	OSF1.50	10750.00	10637.40	OSF>5.00		Exit Alert	
1839.84	82.31	1784.64	1757.53	33.91	OSF1.50	13330.00	10715.00			MinPt-CtCt	
1840.75	85.00	1763.76	1755.75	32.85	OSF1.50	13430.00	10715.00			MINPT-O-EOU	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor	Major	
1841.85	86.33	1783.97	1755.52	32.35	OSF1.50	13480.00	10715.00			MinPt-O-ADP	
1855.56	104.08	1785.85	1751.48	26.98	OSF1.50	14090.00	10715.00			MINPT-O-EOU	
1856.94	105.71	1786.14	1751.23	26.58	OSF1.50	14150.00	10715.00			MinPt-O-ADP	
1858.06	109.29	1784.88	1748.77	25.72	OSF1.50	14260.00	10715.00			MinPt-CtCt	
1880.00	115.52	1782.68	1744.48	24.35	OSF1.50	14480.00	10715.00			MINPT-O-EOU	
1880.89	116.57	1782.85	1744.33	24.14	OSF1.50	14520.00	10715.00			MinPt-O-ADP	
1883.36	150.04	1763.00	1713.32	18.74	OSF1.50	15640.00	10715.00			MinPt-CtCt	
1855.91	168.76	1743.07	1687.14	16.58	OSF1.50	16270.00	10715.00			MinPt-CtCt	
1856.88	172.04	1741.85	1684.83	16.27	OSF1.50	16390.00	10715.00			MINPT-O-EOU	
1858.01	173.37	1742.10	1684.64	16.16	OSF1.50	16440.00	10715.00			MinPt-O-ADP	
1853.24	184.25	1730.08	1688.99	15.16	OSF1.50	16790.00	10715.00			MinPt-CtCt	
1854.30	187.23	1729.15	1687.07	14.93	OSF1.50	16900.00	10715.00			MINPT-O-EOU	
1854.58	192.31	1726.05	1682.27	14.53	OSF1.50	17080.00	10715.00			MinPt-CtCt	
1855.45	202.76	1719.95	1652.69	13.79	OSF1.50	17410.00	10715.00			MinPt-CtCt	
1859.13	234.47	1702.49	1624.66	11.94	OSF1.50	18470.00	10715.00			MinPt-CtCt	
1861.66	246.16	1697.22	1615.50	11.38	OSF1.50	18870.00	10715.00			MINPT-O-EOU	
1856.17	266.26	1678.33	1589.91	10.49	OSF1.50	19530.00	10715.00			MinPt-CtCt	
1856.85	276.75	1672.02	1580.10	10.09	OSF1.50	19880.00	10715.00			MinPt-CtCt	
1857.39	285.13	1666.97	1572.26	9.80	OSF1.50	20180.00	10715.00			MinPt-CtCt	
1857.86	297.78	1659.00	1560.07	9.38	OSF1.50	20580.00	10715.00			MinPt-CtCt	
1858.10	304.03	1655.09	1554.07	9.19	OSF1.50	20780.56	10715.00			MinPts	

EOG Vaca Draw 20 Federal #1
(Offset) Plugged Inc Only Off-
14200ft (Def Survey)

Warning Alert

3676.12	32.81	3674.14	3643.31	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
3676.08	32.81	3674.09	3643.27	622072.47	MAS = 10.00 (m)	10.00	10.00			MinPt-O-SF	
3676.06	32.81	3674.05	3643.25	108036.77	MAS = 10.00 (m)	23.00	23.00			MinPts	
3672.85	39.92	3645.57	3632.93	145.12	OSF1.50	800.00	800.00			MinPt-CtCt	
3563.94	380.63	3309.50	3183.32	14.11	OSF1.50	7420.00	7381.49			MinPt-CtCt	
3562.11	446.11	3264.01	3116.00	12.03	OSF1.50	8680.00	8641.49			MinPt-CtCt	
1846.35	558.51	1472.40	1287.84	4.99	OSF1.50	12420.00	10715.00	OSF<5.00		Enter Alert	
1044.84	562.49	668.94	482.36	2.79	OSF1.50	13940.00	10715.00			MinPts	
1044.87	562.49	668.98	482.38	2.79	OSF1.50	13950.00	10715.00			MinPt-O-SF	
1867.30	561.79	1492.11	1305.51	5.00	OSF1.50	15490.00	10715.00	OSF>6.00		Exit Alert	
6916.40	568.30	6536.87	6348.10	18.31	OSF1.50	20780.56	10715.00			TD	

Hankamer Curtis Bass-Federal
#1 (Offset) Plugged Blind Off-
5074ft (Def Survey)

Warning Alert

4480.51	32.81	4478.53	4447.70	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
4480.50	32.81	4477.06	4447.70	3053.44	MAS = 10.00 (m)	23.00	23.00			WRP	
4461.71	1339.96	3567.74	3121.75	5.00	OSF1.50	4330.00	4314.78	OSF<5.00		Enter Alert	
4456.76	1581.43	3401.81	2875.33	4.23	OSF1.50	5120.00	5097.10			MinPts	
4456.76	1581.41	3401.82	2875.35	4.23	OSF1.50	5130.00	5107.00			MinPt-CtCt	
4842.76	1455.13	3872.03	3387.65	5.00	OSF1.50	7020.00	6981.49	OSF>6.00		Exit Alert	
5811.22	398.42	5544.95	5412.80	21.98	OSF1.50	13710.00	10715.00			MinPt-O-ADP	
5707.62	273.19	5524.84	5434.43	31.56	OSF1.50	14370.00	10715.00			MINPT-O-EOU	
5678.68	227.57	5526.31	5451.11	37.75	OSF1.50	14940.00	10715.00			MinPt-CtCt	
5716.43	294.90	5519.17	5421.53	29.26	OSF1.50	15600.00	10715.00			MINPT-O-EOU	
5813.75	412.42	5538.15	5401.33	21.24	OSF1.50	16190.00	10715.00			MinPt-O-ADP	
7930.56	1124.47	7180.26	6806.10	10.80	OSF1.50	20480.00	10715.00			MinPt-O-SF	
8143.22	1153.05	7373.86	6990.17	10.61	OSF1.50	20780.56	10715.00			TD	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory			Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
Final Surveys - Cimarex Vaca Draw 20-17 Federal #4H ST01 MWD Off-22279ft (Surcon Corrected) (Def Survey)													
	100.00	32.81	98.82	67.19	N/A	MAS = 10.00 (m)	0.00	0.00				MinPis	Pass
	100.01	32.81	98.83	67.20	18917.80	MAS = 10.00 (m)	23.00	23.00				WRP	
	100.12	32.81	98.76	67.31	545.36	MAS = 10.00 (m)	80.00	80.00				MINPT-O-EOU	
	100.32	32.81	98.76	67.52	255.48	MAS = 10.00 (m)	130.00	130.00				MINPT-O-EOU	
	59.40	32.81	48.83	26.59	6.13	MAS = 10.00 (m)	2030.00	2030.00				MinPis	
	59.43	32.81	48.80	26.62	6.09	MAS = 10.00 (m)	2040.00	2040.00				MINPT-O-EOU	
	60.87	32.81	49.84	28.07	5.99	MAS = 10.00 (m)	2120.00	2120.00				MinPt-O-SF	
	100.85	32.81	87.96	68.04	8.43	MAS = 10.00 (m)	2950.00	2948.21				MinPis	
	100.86	32.81	87.96	68.06	8.42	MAS = 10.00 (m)	2960.00	2958.12				MINPT-O-EOU	
	102.88	32.81	89.65	70.08	8.35	MAS = 10.00 (m)	3120.00	3116.56				MinPt-O-SF	
	104.48	32.81	91.11	71.67	8.39	MAS = 10.00 (m)	3220.00	3215.59				MinPt-O-SF	
	107.58	32.81	93.93	74.77	8.45	MAS = 10.00 (m)	3410.00	3403.74				MinPt-O-SF	
	101.93	32.81	87.01	69.12	7.27	MAS = 10.00 (m)	4190.00	4176.15				MinPis	
	101.95	32.81	87.00	69.14	7.26	MAS = 10.00 (m)	4200.00	4186.05				MINPT-O-EOU	
	107.55	32.81	90.66	74.74	6.72	MAS = 10.00 (m)	4770.00	4750.50				MinPis	
	107.60	32.81	90.61	74.79	6.69	MAS = 10.00 (m)	4800.00	4780.21				MINPT-O-EOU	
	114.10	32.81	95.63	81.29	6.49	MAS = 10.00 (m)	5190.00	5166.42				MinPt-O-SF	
	151.66	36.01	127.31	115.66	6.46	OSF1.50	6590.37	6553.15				MinPt-O-SF	
	308.01	45.96	277.02	262.05	10.25	OSF1.50	9680.00	9641.49				MinPt-CtCt	
	308.04	46.06	276.99	261.98	10.23	OSF1.50	9700.00	9661.49				MINPT-O-EOU	
	308.08	46.11	276.99	261.97	10.22	OSF1.50	9710.00	9671.49				MinPt-O-ADP	
	273.45	50.06	239.73	223.39	8.34	OSF1.50	10650.00	10574.41				MinPis	
	273.55	50.10	239.80	223.45	8.33	OSF1.50	10660.00	10581.43				MinPt-O-SF	
	1691.28	75.58	1640.57	1615.70	33.99	OSF1.50	13220.00	10715.00				MINPT-O-EOU	
	1696.59	93.31	1634.06	1603.28	27.55	OSF1.50	13830.00	10715.00				MinPt-CtCt	
	1692.08	150.85	1591.19	1541.23	16.93	OSF1.50	15780.00	10715.00				MinPt-CtCt	
	1647.59	197.10	1515.86	1450.49	12.59	OSF1.50	17330.00	10715.00				MinPt-CtCt	
	1648.74	202.29	1513.56	1446.46	12.28	OSF1.50	17510.00	10715.00				MINPT-O-EOU	
	1649.86	203.66	1513.76	1446.21	12.20	OSF1.50	17560.00	10715.00				MinPt-O-ADP	
	1655.34	209.41	1515.41	1445.93	11.91	OSF1.50	17750.00	10715.00				MINPT-O-EOU	
	1656.98	211.38	1515.73	1445.60	11.81	OSF1.50	17820.00	10715.00				MinPt-O-ADP	
	1662.44	217.03	1517.42	1445.41	11.54	OSF1.50	18010.00	10715.00				MinPt-O-ADP	
	1665.81	221.64	1517.72	1444.17	11.32	OSF1.50	18160.00	10715.00				MINPT-O-EOU	
	1667.41	223.58	1518.03	1443.83	11.23	OSF1.50	18230.00	10715.00				MinPt-O-ADP	
	1677.19	234.33	1520.64	1442.86	10.78	OSF1.50	18590.00	10715.00				MinPt-O-ADP	
	1681.08	248.30	1515.22	1432.78	10.19	OSF1.50	19040.00	10715.00				MinPt-CtCt	
	1680.78	256.12	1509.71	1424.67	9.88	OSF1.50	19300.00	10715.00				MinPt-CtCt	
	1681.02	273.47	1498.38	1407.55	9.25	OSF1.50	19880.00	10715.00				MinPt-CtCt	
	1680.65	286.70	1489.19	1393.95	8.82	OSF1.50	20320.00	10715.00				MinPt-CtCt	
	1682.45	300.43	1481.84	1382.02	8.42	OSF1.50	20780.56	10715.00				MinPis	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #4H MWD Off-12228ft (Surcon Corrected) (Def Survey)													
	100.00	32.81	98.02	67.19	N/A	MAS = 10.00 (m)	0.00	0.00				MinPis	Pass
	100.01	32.81	98.02	67.20	18764.27	MAS = 10.00 (m)	23.00	23.00				WRP	
	100.12	32.81	97.96	67.31	540.94	MAS = 10.00 (m)	80.00	80.00				MINPT-O-EOU	
	100.32	32.81	97.96	67.52	253.42	MAS = 10.00 (m)	130.00	130.00				MINPT-O-EOU	
	59.40	32.81	47.97	26.59	6.08	MAS = 10.00 (m)	2030.00	2030.00				MinPis	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Minor	Major		
59.43	32.81	47.95	26.62	6.05	MAS = 10.00 (m)	2040.00	2040.00			MINPT-O-EOU	
60.87	32.81	48.97	28.07	5.94	MAS = 10.00 (m)	2120.00	2120.00			MinPt-O-SF	
100.85	32.81	87.10	68.04	8.40	MAS = 10.00 (m)	2950.00	2948.21			MinPts	
100.86	32.81	87.10	68.06	8.39	MAS = 10.00 (m)	2960.00	2958.12			MINPT-O-EOU	
102.88	32.81	88.79	70.08	8.33	MAS = 10.00 (m)	3120.00	3116.56			MinPt-O-SF	
104.48	32.81	90.24	71.67	8.36	MAS = 10.00 (m)	3220.00	3215.59			MinPt-O-SF	
107.58	32.81	93.05	74.77	8.41	MAS = 10.00 (m)	3410.00	3403.74			MinPt-O-SF	
101.93	32.81	86.12	69.12	7.23	MAS = 10.00 (m)	4190.00	4176.15			MinPts	
101.95	32.81	86.11	69.14	7.22	MAS = 10.00 (m)	4200.00	4186.05			MINPT-O-EOU	
107.55	32.81	89.76	74.74	6.68	MAS = 10.00 (m)	4770.00	4750.50			MinPts	
107.60	32.81	89.70	74.79	6.64	MAS = 10.00 (m)	4800.00	4780.21			MINPT-O-EOU	
113.80	32.81	94.49	81.00	6.45	MAS = 10.00 (m)	5180.00	5156.51			MinPt-O-SF	
151.66	36.90	126.40	114.76	6.43	MAS = 10.00 (m)	8590.37	8553.15			MinPt-O-SF	
308.01	46.85	276.11	261.16	10.23	OSF1.50	9680.00	9641.49			MinPt-CtCt	
308.04	46.95	276.08	261.09	10.21	OSF1.50	9700.00	9661.49			MINPT-O-EOU	
308.08	47.00	276.08	261.08	10.20	OSF1.50	9710.00	9671.49			MinPt-O-ADP	
273.45	50.95	238.82	222.50	8.32	OSF1.50	10650.00	10574.41			MinPts	
273.55	50.98	238.90	222.57	8.31	OSF1.50	10660.00	10581.43			MinPt-O-SF	
10097.92	56.55	10059.56	10041.37	277.52	OSF1.50	20780.56	10715.00			TD	
Final Surveys - Cimarex Vaca											
Draw 20-17 Federal #2H MWD											
0ft-22179ft (Surcon Corrected)											
(Def Survey)											
134.15	32.81	133.12	101.34	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
134.14	32.81	133.12	101.33	32963.41	MAS = 10.00 (m)	23.00	23.00			WRP	
132.83	32.81	128.99	100.02	46.87	MAS = 10.00 (m)	690.00	690.00			MinPts	
134.77	32.81	126.00	101.96	17.26	MAS = 10.00 (m)	1740.00	1740.00			MINPT-O-EOU	
131.69	32.81	118.99	98.88	11.19	MAS = 10.00 (m)	2560.00	2560.00			MinPts	
131.70	32.81	118.97	98.89	11.16	MAS = 10.00 (m)	2570.00	2569.99			MINPT-O-EOU	
131.92	32.81	119.10	99.11	11.09	MAS = 10.00 (m)	2600.00	2599.98			MinPt-O-SF	
150.67	32.81	137.44	117.86	12.25	MAS = 10.00 (m)	2900.00	2898.70			MinPts	
563.32	43.72	533.83	519.60	19.75	OSF1.50	10030.00	9991.49			MinPt-CtCt	
563.39	43.90	533.78	519.49	19.67	OSF1.50	10060.00	10021.49			MINPT-O-EOU	
563.56	44.08	533.83	519.46	19.60	OSF1.50	10090.00	10051.49			MinPt-O-ADP	
547.64	47.11	515.89	500.53	17.79	OSF1.50	10660.00	10581.43			MinPt-CtCt	
547.67	47.11	515.89	500.50	17.77	OSF1.50	10670.00	10588.29			MinPts	
549.37	47.44	517.40	501.92	17.72	OSF1.50	10720.00	10620.23			MinPt-O-SF	
1721.95	58.77	1682.44	1683.18	44.67	OSF1.50	12340.00	10715.00			MINPT-O-EOU	
1723.43	60.58	1682.72	1662.85	43.35	OSF1.50	12410.00	10715.00			MinPt-O-ADP	
1724.74	74.97	1674.43	1649.77	34.95	OSF1.50	12930.00	10715.00			MinPt-CtCt	
1725.25	76.49	1673.93	1648.76	34.25	OSF1.50	12990.00	10715.00			MINPT-O-EOU	
1726.10	77.50	1674.10	1648.59	33.82	OSF1.50	13030.00	10715.00			MinPt-O-ADP	
1732.55	96.61	1668.49	1636.95	27.45	OSF1.50	13660.00	10715.00			MinPt-CtCt	
1732.86	96.57	1668.17	1636.31	27.18	OSF1.50	13700.00	10715.00			MINPT-O-EOU	
1733.26	97.05	1668.23	1636.21	27.05	OSF1.50	13720.00	10715.00			MinPt-O-ADP	
1742.97	111.81	1668.10	1631.15	23.58	OSF1.50	14230.00	10715.00			MINPT-O-EOU	
1749.72	131.22	1661.91	1618.50	20.14	OSF1.50	14890.00	10715.00			MINPT-O-EOU	
1749.53	143.51	1653.53	1606.02	18.40	OSF1.50	15300.00	10715.00			MinPt-CtCt	
1749.66	151.17	1648.55	1598.49	17.47	OSF1.50	15560.00	10715.00			MinPt-CtCt	
1751.13	155.96	1646.83	1595.18	16.94	OSF1.50	15730.00	10715.00			MINPT-O-EOU	
1753.28	170.15	1639.50	1583.11	15.54	OSF1.50	16200.00	10715.00			MinPt-CtCt	
1753.22	173.42	1637.28	1579.80	15.24	OSF1.50	16310.00	10715.00			MinPt-CtCt	
1754.01	175.81	1636.48	1578.20	15.04	OSF1.50	16400.00	10715.00			MINPT-O-EOU	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #2H MWD
0ft-22179ft (Surcon Corrected)
(Def Survey)

Pass

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor		
1754.85	179.76	1634.68	1575.09	14.72	OSF1.50	16520.00	10715.00			MinPt-CtCt	
1755.77	184.91	1632.17	1570.86	14.31	OSF1.50	16690.00	10715.00			MinPt-CtCt	
1756.49	187.00	1631.50	1569.50	14.16	OSF1.50	16770.00	10715.00			MINPT-O-EOU	
1757.13	187.77	1631.62	1569.36	14.10	OSF1.50	16800.00	10715.00			MinPt-O-ADP	
1758.82	200.05	1625.13	1558.77	13.25	OSF1.50	17200.00	10715.00			MinPt-CtCt	
1759.16	201.24	1624.67	1557.92	13.17	OSF1.50	17250.00	10715.00			MINPT-O-EOU	
1759.54	201.71	1624.74	1557.83	13.14	OSF1.50	17270.00	10715.00			MinPt-O-ADP	
1762.55	205.02	1625.54	1557.53	12.95	OSF1.50	17380.00	10715.00			MINPT-O-EOU	
1763.68	226.95	1612.05	1536.73	11.70	OSF1.50	18100.00	10715.00			MinPt-CtCt	
1764.57	229.63	1611.15	1534.94	11.57	OSF1.50	18200.00	10715.00			MINPT-O-EOU	
1765.41	230.69	1611.29	1534.72	11.52	OSF1.50	18240.00	10715.00			MinPt-O-ADP	
1766.78	247.95	1601.15	1518.83	10.72	OSF1.50	18800.00	10715.00			MinPt-CtCt	
1767.49	250.01	1600.49	1517.48	10.64	OSF1.50	18880.00	10715.00			MINPT-O-EOU	
1749.13	271.61	1567.73	1477.53	9.69	OSF1.50	19590.00	10715.00			MinPt-CtCt	
1750.25	274.24	1567.10	1476.01	9.80	OSF1.50	19690.00	10715.00			MINPT-O-EOU	
1726.26	297.44	1527.64	1428.82	8.73	OSF1.50	20450.00	10715.00			MinPt-CtCt	
1726.98	299.83	1526.76	1427.15	8.66	OSF1.50	20540.00	10715.00			MINPT-O-EOU	
1727.80	300.85	1526.90	1426.95	8.64	OSF1.50	20580.00	10715.00			MinPt-O-ADP	
1722.23	307.64	1516.81	1414.59	8.42	OSF1.50	20780.56	10715.00			MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #43H
MWD 0ft-19167ft (Surcon
Corrected) (Def Survey)

1120.33	32.81	1119.05	1087.53	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
1120.32	32.81	1119.03	1087.51	N/A	MAS = 10.00 (m)	23.00	23.00			WRP	
1119.26	32.81	1115.57	1086.45	464.34	MAS = 10.00 (m)	580.00	580.00			MinPts	
1118.76	32.81	1113.16	1085.95	259.15	MAS = 10.00 (m)	1030.00	1030.00			MinPts	
1118.77	32.81	1113.00	1085.96	249.21	MAS = 10.00 (m)	1070.00	1070.00			MINPT-O-EOU	
565.04	32.81	542.70	532.23	27.26	MAS = 10.00 (m)	6740.00	6701.81			MinPt-O-SF	
555.28	32.81	533.70	522.48	27.82	MAS = 10.00 (m)	6990.00	6951.49			MINPT-O-EOU	
538.40	38.60	512.08	499.80	21.83	OSF1.50	8860.00	8821.49			MinPt-CtCt	
542.65	38.65	512.07	499.77	21.81	OSF1.50	8870.00	8831.49			MinPts	
1498.65	39.28	515.90	503.38	21.60	OSF1.50	8990.00	8951.49			MinPt-O-SF	
1498.71	35.70	1474.51	1462.95	64.77	OSF1.50	11240.00	10715.00			MinPt-CtCt	
1498.81	35.93	1474.42	1462.78	64.35	OSF1.50	11260.00	10715.00			MINPT-O-EOU	
1498.81	36.05	1474.44	1462.76	64.14	OSF1.50	11270.00	10715.00			MinPt-O-ADP	
1492.35	65.08	1448.63	1427.27	34.90	OSF1.50	12560.00	10715.00			MinPt-CtCt	
1457.51	137.47	1365.54	1320.04	16.01	OSF1.50	15100.00	10715.00			MinPt-CtCt	
1456.31	152.79	1354.12	1303.51	14.38	OSF1.50	15620.00	10715.00			MinPt-CtCt	
1458.28	158.21	1352.47	1300.07	13.90	OSF1.50	15820.00	10715.00			MINPT-O-EOU	
1450.99	168.47	1348.35	1292.52	13.08	OSF1.50	16150.00	10715.00			MinPt-CtCt	
1458.76	183.95	1335.80	1274.82	11.95	OSF1.50	16670.00	10715.00			MinPt-CtCt	
1449.83	209.24	1310.00	1240.58	10.44	OSF1.50	17520.00	10715.00			MinPt-CtCt	
1449.36	232.36	1294.13	1217.00	9.39	OSF1.50	18290.00	10715.00			MinPt-CtCt	
1449.04	239.59	1288.99	1209.45	9.10	OSF1.50	18530.00	10715.00			MinPt-CtCt	
1445.08	250.29	1277.89	1194.78	8.69	OSF1.50	18890.00	10715.00			MinPt-CtCt	
1442.14	259.76	1268.64	1182.38	8.35	OSF1.50	19210.00	10715.00			MinPt-CtCt	
1442.18	263.34	1266.29	1178.84	8.24	OSF1.50	19330.00	10715.00			MinPt-CtCt	
1443.02	265.86	1265.46	1177.16	8.17	OSF1.50	19430.00	10715.00			MINPT-O-EOU	
1447.58	292.11	1252.51	1155.47	7.45	OSF1.50	20290.00	10715.00			MinPt-CtCt	
1449.45	297.92	1250.50	1151.52	7.32	OSF1.50	20500.00	10715.00			MINPT-O-EOU	
1451.43	300.41	1250.83	1151.02	7.27	OSF1.50	20590.00	10715.00			MINPT-O-ADP	
1456.49	306.55	1251.80	1149.94	7.14	OSF1.50	20780.56	10715.00			MinPts	

Offset Trajectory	Separation		Allow	Sep. Fact.	Controlling Rule	Reference Trajectory		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)		

Cimarex Vaca Draw 20-17
Federal #31H Rev1 RM
20Feb20 (Def Plan)

739.23	32.81	737.94	706.42	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
739.23	32.81	737.93	706.42	89765.58	MAS = 10.00 (m)	23.00	23.00	WRP	
739.23	32.81	722.67	706.42	48.30	MAS = 10.00 (m)	2490.00	2490.00	MinPts	
739.23	32.81	722.63	706.42	48.17	MAS = 10.00 (m)	2500.00	2500.00	MINPT-O-EOU	
741.75	32.81	725.00	708.95	47.88	MAS = 10.00 (m)	2600.00	2599.98	MinPt-O-SF	
778.45	32.81	762.48	745.64	52.93	MAS = 10.00 (m)	2900.00	2898.70	MinPts	
1396.94	37.64	1371.42	1359.30	57.59	OSF1.50	6600.00	6562.70	MinPt-O-SF	
1416.81	347.76	1184.55	1069.06	6.13	OSF1.50	20780.56	10715.00	MinPts	

Cimarex Vaca Draw 20-17
Federal #30H Rev1 RM
20Feb20 (Def Plan)

759.21	32.81	757.92	726.40	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
759.21	32.81	757.92	726.40	83201.48	MAS = 10.00 (m)	23.00	23.00	WRP	
759.21	32.81	745.79	726.40	62.45	MAS = 10.00 (m)	1990.00	1990.00	MinPts	
759.25	32.81	745.74	726.44	62.01	MAS = 10.00 (m)	2010.00	2010.00	MINPT-O-EOU	
793.33	32.81	778.38	760.53	57.94	MAS = 10.00 (m)	2500.00	2500.00	MinPt-O-SF	
884.81	32.81	869.78	852.00	64.29	MAS = 10.00 (m)	2900.00	2898.70	MinPts	
1989.49	44.76	1959.22	1944.73	68.60	OSF1.50	6580.00	6542.89	MinPt-O-SF	
2029.38	58.20	1990.15	1971.18	53.45	OSF1.50	9940.00	9901.49	MINPT-O-EOU	
2029.43	58.25	1990.17	1971.18	53.41	OSF1.50	9950.00	9911.49	MinPt-O-ADP	
2050.43	59.70	2010.20	1990.73	52.62	OSF1.50	10290.00	10251.49	MinPt-O-SF	
2173.69	344.85	1943.36	1828.84	9.48	OSF1.50	20780.56	10715.00	MinPts	

Cimarex Vaca Draw 20-17
Federal #29H Rev1 RM
20Feb20 (Def Plan)

779.23	32.81	777.95	746.42	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
779.23	32.81	777.94	746.42	94631.65	MAS = 10.00 (m)	23.00	23.00	WRP	
779.23	32.81	768.96	746.42	86.50	MAS = 10.00 (m)	1490.00	1490.00	MinPts	
779.27	32.81	768.90	746.46	85.66	MAS = 10.00 (m)	1510.00	1510.00	MINPT-O-EOU	
908.47	32.81	884.26	875.66	70.17	MAS = 10.00 (m)	2590.00	2589.99	MinPt-O-SF	
983.83	32.81	969.23	951.02	73.81	MAS = 10.00 (m)	2900.00	2898.70	MinPts	
2068.88	47.31	2036.91	2021.56	67.38	OSF1.50	6590.37	6553.15	MinPt-O-SF	
2152.51	61.35	2111.18	2091.16	53.72	OSF1.50	10310.00	10271.46	MINPT-O-EOU	
2152.61	61.48	2111.19	2091.13	53.61	OSF1.50	10330.00	10291.37	MinPt-O-ADP	
2174.62	344.04	1944.83	1830.58	9.51	OSF1.50	20780.56	10715.00	MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #13H
MWD 0ft-22542ft (Surcon
Corrected) (Def Survey)

1299.82	32.81	1297.84	1267.01	N/A	MAS = 10.00 (m)	0.00	0.00	MinPts	Pass
1299.82	32.81	1297.83	1267.01	99708.08	MAS = 10.00 (m)	23.00	23.00	WRP	
1300.11	32.81	1297.45	1267.30	1898.23	MAS = 10.00 (m)	190.00	190.00	MINPT-O-EOU	
1114.64	32.81	1101.57	1081.83	93.99	MAS = 10.00 (m)	2600.00	2599.98	MinPt-O-SF	
1110.18	32.81	1097.19	1077.37	94.32	MAS = 10.00 (m)	2760.00	2759.64	MinPts	
1113.76	32.81	1100.77	1080.95	94.62	MAS = 10.00 (m)	2900.00	2898.70	MinPts	
1127.54	32.81	1114.38	1094.73	94.35	MAS = 10.00 (m)	3180.00	3175.98	MinPt-O-SF	
1146.70	32.81	1130.29	1113.89	75.28	MAS = 10.00 (m)	4560.00	4542.55	MinPts	
1146.72	32.81	1130.26	1113.91	75.02	MAS = 10.00 (m)	4580.00	4562.35	MINPT-O-EOU	
1191.15	35.62	1167.03	1155.53	51.75	OSF1.50	8600.00	6562.70	MinPt-O-SF	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor	Major	
	988.15	46.44	926.65	911.72	32.03	OSF1.50	9600.00	9561.49			MinPt-CtCt
	988.25	46.74	926.54	911.51	31.81	OSF1.50	9660.00	9621.49			MINPT-O-EOU
	988.37	46.89	926.57	911.48	31.71	OSF1.50	9690.00	9651.49			MinPt-O-ADP
	983.64	51.31	948.92	932.34	29.61	OSF1.50	10710.00	10614.16			MinPt-O-SF
	2041.50	66.65	1986.74	1974.85	46.61	OSF1.50	12440.00	10715.00			MinPts
	2047.44	70.27	2000.27	1977.17	44.31	OSF1.50	12550.00	10715.00			MINPT-O-EOU
	2048.57	71.53	2000.55	1977.04	43.54	OSF1.50	12600.00	10715.00			MinPt-O-ADP
	2046.97	81.37	1992.39	1965.60	38.18	OSF1.50	12950.00	10715.00			MinPt-CtCt
	2049.07	86.79	1980.89	1962.29	35.81	OSF1.50	13160.00	10715.00			MINPT-O-EOU
	2050.27	88.33	1961.06	1961.94	35.19	OSF1.50	13220.00	10715.00			MinPt-O-ADP
	2067.89	107.63	1995.81	1960.26	29.07	OSF1.50	13890.00	10715.00			MinPt-CtCt
	2066.64	120.81	1965.78	1945.84	25.86	OSF1.50	14350.00	10715.00			MinPt-CtCt
	2068.56	130.45	1981.26	1938.11	23.96	OSF1.50	14680.00	10715.00			MinPt-CtCt
	2069.40	133.00	1980.41	1936.40	23.50	OSF1.50	14780.00	10715.00			MINPT-O-EOU
	2074.85	144.65	1978.09	1930.20	21.65	OSF1.50	15160.00	10715.00			MinPt-CtCt
	2075.29	146.05	1977.59	1929.23	21.45	OSF1.50	15220.00	10715.00			MINPT-O-EOU
	2075.83	146.74	1977.67	1929.09	21.35	OSF1.50	15250.00	10715.00			MinPt-O-ADP
	2079.75	150.59	1979.03	1929.17	20.84	OSF1.50	15380.00	10715.00			MINPT-O-EOU
	2053.07	184.76	1929.57	1868.31	16.75	OSF1.50	16520.00	10715.00			MinPt-CtCt
	2052.49	195.22	1922.01	1857.27	15.84	OSF1.50	16870.00	10715.00			MinPt-CtCt
	2053.12	197.13	1921.37	1855.99	15.69	OSF1.50	16950.00	10715.00			MINPT-O-EOU
	2056.35	207.33	1917.80	1849.02	14.94	OSF1.50	17290.00	10715.00			MINPT-O-EOU
	2057.13	208.30	1917.93	1848.83	14.88	OSF1.50	17330.00	10715.00			MinPt-O-ADP
	2054.62	221.77	1906.45	1832.86	13.95	OSF1.50	17760.00	10715.00			MinPt-CtCt
	2051.63	236.75	1893.47	1814.88	13.05	OSF1.50	18260.00	10715.00			MinPt-CtCt
	2043.48	269.21	1863.67	1774.26	11.42	OSF1.50	19340.00	10715.00			MinPt-CtCt
	2043.72	274.60	1860.32	1769.12	11.20	OSF1.50	19520.00	10715.00			MinPt-CtCt
	2043.75	282.67	1854.97	1761.08	10.88	OSF1.50	19790.00	10715.00			MinPt-CtCt
	2034.55	308.83	1828.34	1725.72	9.91	OSF1.50	20660.00	10715.00			MinPt-CtCt
	2034.48	312.53	1825.80	1721.95	9.79	OSF1.50	20780.56	10715.00			MinPts

Cimarex Vaca Draw 20-17
Federal #57H Rev1 RM
09Feb21 (Def Plan)

Pass

2339.35	32.81	2338.06	2306.54	N/A	MAS = 10.00 (m)	0.00	0.00	Surface
2339.29	32.81	2337.99	2306.48	325992.46	MAS = 10.00 (m)	10.00	10.00	MinPt-O-SF
2339.27	32.81	2337.99	2306.46	N/A	MAS = 10.00 (m)	23.00	23.00	WRP
2338.59	32.81	2321.81	2305.78	150.88	MAS = 10.00 (m)	2540.00	2540.00	MinPt-O-SF
974.79	64.67	930.64	910.13	23.69	OSF1.50	10360.00	10321.06	MinPt-CtCt
974.87	64.97	930.51	909.90	23.57	OSF1.50	10410.00	10369.74	MINPT-O-EOU
974.96	65.09	930.52	909.87	23.53	OSF1.50	10430.00	10388.83	MinPt-O-ADP
983.74	66.30	938.52	917.44	23.26	OSF1.50	10650.00	10574.41	MinPt-O-SF
2068.20	326.48	1850.12	1741.72	9.53	OSF1.50	20780.56	10715.00	MinPts

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #44H
MWD 0ft-19884ft (Surcon
Corrected) (Def Survey)

Pass

1140.30	32.81	1139.01	1107.49	N/A	MAS = 10.00 (m)	0.00	0.00	Surface
1140.28	32.81	1138.99	1107.47	N/A	MAS = 10.00 (m)	23.00	23.00	WRP
1140.22	32.81	1138.12	1107.41	1392.79	MAS = 10.00 (m)	220.00	220.00	MinPts
1140.83	32.81	1135.40	1108.02	274.58	MAS = 10.00 (m)	990.00	990.00	MinPts
1140.82	32.81	1135.03	1108.01	263.10	MAS = 10.00 (m)	1070.00	1070.00	MINPT-O-EOU
1134.68	32.81	1124.28	1101.87	122.39	MAS = 10.00 (m)	2110.00	2110.00	MinPts

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor	Major	
1134.79	32.81	1124.19	1101.98	119.73	MAS = 10.00 (m)	2160.00	2160.00			MINPT-O-EOU	
1139.65	32.81	1127.40	1106.84	102.37	MAS = 10.00 (m)	2600.00	2599.98			MinPt-O-SF	
1138.19	32.81	1126.10	1105.39	103.68	MAS = 10.00 (m)	2940.00	2938.31			MinPt-O-SF	
1138.17	32.81	1126.07	1105.36	103.68	MAS = 10.00 (m)	2950.00	2948.21			MinPts	
1143.11	32.81	1128.48	1110.31	84.59	MAS = 10.00 (m)	4430.00	4413.81			MinPts	
1143.13	32.81	1128.47	1110.32	84.41	MAS = 10.00 (m)	4440.00	4423.71			MINPT-O-EOU	
1144.36	32.81	1129.11	1111.55	80.96	MAS = 10.00 (m)	4620.00	4601.96			MinPts	
1144.41	32.81	1129.06	1111.60	80.41	MAS = 10.00 (m)	4650.00	4631.67			MINPT-O-EOU	
1135.31	32.81	1116.77	1102.51	64.73	MAS = 10.00 (m)	5550.00	5522.91			MinPts	
1135.47	32.81	1116.64	1102.66	63.71	MAS = 10.00 (m)	5620.00	5592.23			MINPT-O-EOU	
1104.38	33.90	1081.41	1070.48	50.44	OSF1.50	8600.00	8582.70			MinPt-O-SF	
1089.45	32.81	1067.31	1056.64	51.76	MAS = 10.00 (m)	6900.00	6881.50			MinPts	
1139.15	41.67	1111.04	1097.49	42.00	OSF1.50	9480.00	9421.49			MinPt-O-SF	
1130.66	42.04	1102.28	1088.61	41.31	OSF1.50	9590.00	9551.49			MinPt-O-SF	
1118.80	43.31	1089.58	1075.50	39.67	OSF1.50	9810.00	9771.49			MinPt-CtCt	
1118.82	43.37	1089.56	1075.45	39.61	OSF1.50	9820.00	9781.49			MinPts	
1128.04	44.23	1098.21	1083.81	39.12	OSF1.50	9980.00	9941.49			MinPt-O-SF	
1297.69	48.97	1264.70	1248.72	40.56	OSF1.50	11190.00	10715.00			MinPt-CtCt	
1297.77	49.25	1264.59	1248.51	40.33	OSF1.50	11210.00	10715.00			MINPT-O-EOU	
1297.87	49.40	1264.60	1248.48	40.21	OSF1.50	11220.00	10715.00			MinPt-O-ADP	
1280.46	88.81	1220.92	1191.65	21.85	OSF1.50	12990.00	10715.00			MinPt-CtCt	
1280.88	90.50	1220.21	1190.37	21.45	OSF1.50	13060.00	10715.00			MINPT-O-EOU	
1281.46	91.20	1220.33	1190.26	21.29	OSF1.50	13090.00	10715.00			MinPt-O-ADP	
1299.41	104.94	1229.12	1194.47	18.74	OSF1.50	13590.00	10715.00			MINPT-O-EOU	
1301.21	107.04	1229.52	1194.17	18.39	OSF1.50	13670.00	10715.00			MinPt-O-ADP	
1264.89	161.15	1157.13	1103.74	11.84	OSF1.50	15550.00	10715.00			MinPt-CtCt	
1286.04	168.77	1153.19	1097.27	11.31	OSF1.50	15810.00	10715.00			MinPt-CtCt	
1266.18	179.37	1146.27	1086.81	10.64	OSF1.50	16170.00	10715.00			MinPt-CtCt	
1286.78	181.22	1145.64	1085.56	10.53	OSF1.50	16240.00	10715.00			MINPT-O-EOU	
1267.46	181.99	1145.80	1085.47	10.50	OSF1.50	16270.00	10715.00			MinPt-O-ADP	
1289.12	188.49	1143.14	1080.64	10.14	OSF1.50	16480.00	10715.00			MinPt-CtCt	
1269.77	190.35	1142.53	1079.41	10.05	OSF1.50	16550.00	10715.00			MINPT-O-EOU	
1274.20	200.97	1139.89	1073.23	9.55	OSF1.50	16910.00	10715.00			MINPT-O-EOU	
1251.21	233.54	1095.19	1017.67	8.06	OSF1.50	18000.00	10715.00			MinPt-CtCt	
1251.82	235.41	1094.55	1016.41	8.00	OSF1.50	18070.00	10715.00			MINPT-O-EOU	
1252.50	236.19	1094.71	1016.30	7.98	OSF1.50	18100.00	10715.00			MinPt-O-ADP	
1288.39	250.57	1091.02	1007.82	7.56	OSF1.50	18570.00	10715.00			MinPt-CtCt	
1260.26	254.82	1090.05	1005.43	7.44	OSF1.50	18720.00	10715.00			MINPT-O-EOU	
1283.44	311.84	1055.22	951.60	6.09	OSF1.50	20620.00	10715.00			MinPt-CtCt	
1264.23	316.58	1052.84	947.64	6.00	OSF1.50	20780.56	10715.00			MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #45H Off-
19226ft (Surcon Corrected)
(Def Survey)

Pass

1160.27	32.81	1158.99	1127.47	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
1160.25	32.81	1158.96	1127.44	467130.88	MAS = 10.00 (m)	23.00	23.00			WRP	
1158.81	32.81	1156.03	1126.01	771.92	MAS = 10.00 (m)	350.00	350.00			MinPts	
1158.89	32.81	1155.97	1126.06	709.62	MAS = 10.00 (m)	380.00	380.00			MINPT-O-EOU	
1164.27	32.81	1158.25	1131.47	237.59	MAS = 10.00 (m)	1160.00	1160.00			MINPT-O-EOU	
1228.71	32.81	1216.24	1195.90	108.22	MAS = 10.00 (m)	2600.00	2599.98			MinPt-O-SF	
1262.20	32.81	1249.30	1229.39	107.11	MAS = 10.00 (m)	3320.00	3314.61			MinPt-O-SF	
1264.89	32.81	1251.23	1232.09	100.81	MAS = 10.00 (m)	3790.00	3780.04			MinPts	
1264.92	32.81	1251.21	1232.11	100.43	MAS = 10.00 (m)	3810.00	3799.85			MINPT-O-EOU	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)		
	1264.30	32.81	1249.64	1231.49	93.38	MAS = 10.00 (m)	4180.00	4146.44	MinPls
	1264.33	32.81	1249.61	1231.52	92.94	MAS = 10.00 (m)	4180.00	4166.24	MINPT-O-EOU
	1285.56	32.81	1250.18	1232.75	88.74	MAS = 10.00 (m)	4390.00	4374.20	MINPT-O-EOU
	1275.26	32.81	1257.45	1242.45	76.38	MAS = 10.00 (m)	5120.00	5097.10	MINPT-O-EOU
	1275.12	32.81	1257.02	1242.31	74.60	MAS = 10.00 (m)	5240.00	5215.93	MinPls
	1275.16	32.81	1256.96	1242.35	74.18	MAS = 10.00 (m)	5270.00	5245.64	MINPT-O-EOU
	1294.30	34.18	1271.17	1260.12	58.50	OSF1.50	6520.00	6483.47	MinPt-O-ADP
	1294.98	34.67	1271.53	1260.31	57.68	OSF1.50	6600.00	6562.70	MinPt-O-SF
	1475.72	39.86	1448.81	1435.86	56.96	OSF1.50	8660.00	8621.49	MinPt-O-ADP
	1476.17	40.73	1448.68	1435.44	55.73	OSF1.50	8890.00	8851.49	MinPt-CtCt
	1476.19	40.82	1448.64	1435.37	55.60	OSF1.50	8910.00	8871.49	MINPT-O-EOU
	1476.22	40.87	1448.64	1435.35	55.53	OSF1.50	8920.00	8881.49	MinPt-O-ADP
	1505.94	43.52	1476.98	1462.42	53.12	OSF1.50	9440.00	9401.49	MinPt-O-SF
	1996.32	78.23	1943.83	1918.09	38.77	OSF1.50	12490.00	10715.00	MinPt-CtCt
	1954.54	130.17	1867.42	1824.37	22.69	OSF1.50	14330.00	10715.00	MinPt-CtCt
	1952.85	154.80	1849.31	1798.05	19.04	OSF1.50	15170.00	10715.00	MinPt-CtCt
	1949.71	176.32	1831.82	1773.39	16.67	OSF1.50	15900.00	10715.00	MinPt-CtCt
	1950.61	178.88	1831.02	1771.73	16.44	OSF1.50	16000.00	10715.00	MINPT-O-EOU
	1957.71	188.82	1831.49	1768.89	15.63	OSF1.50	16340.00	10715.00	MINPT-O-EOU
	1966.32	203.39	1830.38	1762.93	14.57	OSF1.50	16830.00	10715.00	MINPT-O-EOU
	1971.72	211.44	1830.42	1760.28	14.05	OSF1.50	17100.00	10715.00	MINPT-O-EOU
	1972.32	212.17	1830.54	1760.15	14.00	OSF1.50	17130.00	10715.00	MinPt-O-ADP
	1977.08	223.17	1827.96	1753.91	13.34	OSF1.50	17480.00	10715.00	MinPt-CtCt
	1975.17	229.44	1821.87	1745.73	12.96	OSF1.50	17690.00	10715.00	MinPt-CtCt
	1979.08	242.95	1816.78	1736.13	12.26	OSF1.50	18140.00	10715.00	MinPt-CtCt
	1949.92	263.35	1774.02	1686.57	11.14	OSF1.50	18820.00	10715.00	MinPt-CtCt
	1950.54	265.02	1773.52	1685.51	11.08	OSF1.50	18890.00	10715.00	MINPT-O-EOU
	1951.38	266.03	1773.68	1685.34	11.04	OSF1.50	18930.00	10715.00	MinPt-O-ADP
	1957.91	281.80	1769.71	1676.11	10.45	OSF1.50	19430.00	10715.00	MinPt-CtCt
	1959.27	292.96	1763.62	1666.31	10.06	OSF1.50	19800.00	10715.00	MinPt-CtCt
	1965.98	309.17	1759.52	1656.80	9.56	OSF1.50	20360.00	10715.00	MINPT-O-EOU
	1971.11	315.18	1760.65	1655.93	9.41	OSF1.50	20570.00	10715.00	MinPt-O-ADP
	1974.96	319.08	1761.89	1655.87	9.31	OSF1.50	20700.00	10715.00	MinPt-O-ADP
	1977.49	321.34	1762.93	1656.15	9.26	OSF1.50	20780.56	10715.00	MinPt-O-SF

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #8H MWD
0ft-22328ft (Surcon Corrected)
(Def Survey)

Pass

1319.81	32.81	1318.68	1287.00	N/A	MAS = 10.00 (m)	0.00	0.00	MinPls
1319.82	32.81	1318.67	1287.01	103354.03	MAS = 10.00 (m)	23.00	23.00	WRP
1320.36	32.81	1318.05	1287.55	1118.85	MAS = 10.00 (m)	310.00	310.00	MinPls
1321.21	32.81	1317.55	1288.40	522.47	MAS = 10.00 (m)	590.00	590.00	MINPT-O-EOU
1316.01	32.81	1308.03	1283.20	192.21	MAS = 10.00 (m)	1560.00	1560.00	MinPls
1316.15	32.81	1307.92	1283.34	185.30	MAS = 10.00 (m)	1610.00	1610.00	MINPT-O-EOU
1257.61	32.81	1245.15	1224.81	111.25	MAS = 10.00 (m)	2690.00	2689.86	MinPls
1258.05	32.81	1245.57	1225.24	111.05	MAS = 10.00 (m)	2740.00	2739.72	MinPt-O-SF
1264.56	32.81	1252.19	1231.75	112.72	MAS = 10.00 (m)	2900.00	2898.70	MinPls
1290.22	32.81	1277.61	1257.41	112.44	MAS = 10.00 (m)	3310.00	3304.71	MinPt-O-SF
1517.40	33.64	1494.60	1483.76	69.95	OSF1.50	6590.37	6553.15	MinPt-CtCt
1381.97	40.25	1354.76	1341.72	52.95	OSF1.50	9110.00	9071.49	MinPt-CtCt
1382.11	40.71	1354.59	1341.39	52.34	OSF1.50	9210.00	9171.49	MINPT-O-EOU
1382.27	40.90	1354.62	1341.37	52.10	OSF1.50	9250.00	9211.49	MinPt-O-ADP
1383.37	41.92	1355.05	1341.46	50.84	OSF1.50	9460.00	9421.49	MinPt-O-ADP

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor	Major	
	1799.20	33.53	1776.50	83.02	OSF1.50	7820.00	7781.49				MinPt-O-ADP
	1799.97	34.16	1776.86	81.50	OSF1.50	7990.00	7951.49				MinPt-O-ADP
	1800.55	34.78	1777.02	80.03	OSF1.50	8150.00	8111.49				MINPT-O-EOU
	1800.58	34.81	1777.02	79.94	OSF1.50	8160.00	8121.49				MinPt-O-ADP
	1825.38	42.69	1796.57	65.72	OSF1.50	9880.00	9841.49				MinPt-CtCt
	1825.47	43.07	1796.41	65.13	OSF1.50	9980.00	9921.49				MINPT-O-EOU
	1825.54	43.15	1796.43	65.00	OSF1.50	9980.00	9941.49				MinPt-O-ADP
	1824.98	46.08	1793.93	60.76	OSF1.50	10540.00	10488.25				MinPt-CtCt
	1825.02	46.17	1793.89	60.63	OSF1.50	10560.00	10505.04				MINPT-O-EOU
	1825.07	46.22	1793.90	60.56	OSF1.50	10570.00	10513.27				MinPt-O-ADP
	1862.97	48.59	1830.22	58.74	OSF1.50	10990.00	10713.64				MinPt-O-SF
	1867.11	48.70	1834.30	58.74	OSF1.50	11010.00	10714.73				MinPt-O-SF
	1871.48	48.81	1838.59	58.75	OSF1.50	11030.00	10715.00				MinPt-CtCt
	2523.65	79.02	2470.65	48.49	OSF1.50	12670.00	10715.00				MINPT-O-EOU
	2524.10	80.29	2470.25	47.72	OSF1.50	12730.00	10715.00				MinPt-O-ADP
	2525.45	81.94	2470.49	46.78	OSF1.50	12800.00	10715.00				MinPt-CtCt
	2545.05	96.40	2480.45	39.99	OSF1.50	13330.00	10715.00				MinPt-CtCt
	2541.41	126.02	2457.07	30.48	OSF1.50	14350.00	10715.00				MinPts
	2541.71	127.07	2456.67	30.23	OSF1.50	14400.00	10715.00				MinPt-CtCt
	2543.41	130.33	2456.20	30.08	OSF1.50	14430.00	10715.00				MINPT-O-EOU
	2543.11	139.42	2449.84	29.49	OSF1.50	14500.00	10715.00				MinPt-O-ADP
	2543.64	140.96	2449.34	27.25	OSF1.50	14810.00	10715.00				MinPt-CtCt
	2543.75	144.09	2447.36	26.65	OSF1.50	14880.00	10715.00				MinPt-CtCt
	2544.01	144.89	2447.09	26.51	OSF1.50	14970.00	10715.00				MINPT-O-EOU
	2544.32	145.29	2447.13	26.44	OSF1.50	15010.00	10715.00				MINPT-O-EOU
	2567.49	208.13	2428.41	18.59	OSF1.50	15030.00	10715.00				MinPt-O-ADP
	2572.03	223.09	2422.98	17.36	OSF1.50	17140.00	10715.00				MinPt-CtCt
	2566.37	246.38	2401.79	15.68	OSF1.50	17660.00	10715.00				MinPt-CtCt
	2567.39	263.81	2391.19	14.65	OSF1.50	18420.00	10715.00				MinPt-CtCt
	2568.31	266.51	2390.31	14.50	OSF1.50	19000.00	10715.00				MinPt-CtCt
	2569.90	281.52	2381.89	13.74	OSF1.50	19110.00	10715.00				MINPT-O-EOU
	2564.08	294.13	2367.67	13.12	OSF1.50	19590.00	10715.00				MinPt-CtCt
	2563.01	300.74	2362.19	12.82	OSF1.50	20010.00	10715.00				MinPt-CtCt
	2563.60	302.61	2361.54	12.74	OSF1.50	20230.00	10715.00				MinPt-CtCt
	2564.35	303.52	2361.67	12.71	OSF1.50	20310.00	10715.00				MINPT-O-EOU
	2568.51	313.71	2359.04	12.32	OSF1.50	20350.00	10715.00				MinPt-O-ADP
	2568.06	317.61	2355.98	12.16	OSF1.50	20680.00	10715.00				MinPt-CtCt
						20780.56	10715.00				MinPts

Cimarex Vaca Draw 20-17
Federal #6H MWD
Final(Surcon Corrected) (Def
Survey)

Pass

1401.10	32.81	1399.12	1368.29	N/A	MAS = 10.00 (m)	0.00	0.00	Surface
1401.08	32.81	1399.07	1368.27	57256.55	MAS = 10.00 (m)	23.00	23.00	WRP
1397.46	32.81	1392.41	1364.66	453.98	MAS = 10.00 (m)	720.00	720.00	MinPts
1398.12	32.81	1392.12	1365.31	348.01	MAS = 10.00 (m)	940.00	940.00	MINPT-O-EOU
1382.24	32.81	1368.74	1349.43	119.84	MAS = 10.00 (m)	2580.00	2579.99	MinPts
1382.25	32.81	1368.73	1349.45	119.85	MAS = 10.00 (m)	2590.00	2589.99	MINPT-O-EOU
1382.31	32.81	1368.76	1349.51	119.52	MAS = 10.00 (m)	2600.00	2599.98	MinPt-O-SF
1403.93	32.81	1390.67	1371.12	124.34	MAS = 10.00 (m)	2900.00	2898.70	MinPts
1449.90	32.81	1436.38	1417.09	125.47	MAS = 10.00 (m)	3210.00	3205.68	MinPt-O-SF
1502.01	32.81	1488.28	1469.20	127.64	MAS = 10.00 (m)	3560.00	3552.28	MinPt-O-SF
1509.80	32.81	1496.01	1476.99	127.63	MAS = 10.00 (m)	3610.00	3601.79	MinPt-O-SF

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor	Major	
1988.07	33.24	1945.26	1934.84	94.33	OSF1.50	6590.37	6553.15			MinPt-O-SF	
2001.62	32.81	1979.58	1968.81	99.68	MAS = 10.00 (m)	7160.00	7121.49			MinPts	
2001.66	32.81	1979.52	1968.85	99.21	MAS = 10.00 (m)	7220.00	7181.49			MINPT-O-EOU	
2039.61	38.83	2013.06	2000.78	82.94	OSF1.50	9080.00	9041.49			MinPt-O-SF	
2623.79	41.36	2595.56	2582.43	99.87	OSF1.50	10670.00	10588.29			MinPt-O-SF	
2647.27	46.36	2615.70	2600.90	89.40	OSF1.50	11380.00	10715.00			MinPt-CtCt	
2647.32	46.53	2615.64	2600.79	89.07	OSF1.50	11400.00	10715.00			MINPT-O-EOU	
2647.47	46.71	2615.67	2600.76	88.71	OSF1.50	11420.00	10715.00			MinPt-O-ADP	
2657.03	50.55	2622.67	2606.48	82.00	OSF1.50	11690.00	10715.00			MinPt-O-ADP	
2662.04	56.28	2623.86	2605.75	73.47	OSF1.50	11930.00	10715.00			MINPT-O-EOU	
2662.40	56.74	2623.91	2605.66	72.87	OSF1.50	11960.00	10715.00			MinPt-O-ADP	
2648.51	68.73	2602.03	2579.78	59.47	OSF1.50	12470.00	10715.00			MinPt-CtCt	
2648.80	69.50	2601.81	2579.30	58.80	OSF1.50	12520.00	10715.00			MINPT-O-EOU	
2649.07	69.81	2601.87	2579.26	58.53	OSF1.50	12540.00	10715.00			MinPt-O-ADP	
2627.72	98.28	2561.54	2529.44	40.90	OSF1.50	13590.00	10715.00			MinPt-CtCt	
2627.94	98.90	2561.35	2529.04	40.64	OSF1.50	13630.00	10715.00			MINPT-O-EOU	
2628.22	99.21	2561.42	2529.00	40.51	OSF1.50	13650.00	10715.00			MinPt-O-ADP	
2648.26	113.48	2571.94	2534.77	35.60	OSF1.50	14130.00	10715.00			MinPt-CtCt	
2648.02	123.49	2565.03	2524.52	32.66	OSF1.50	14480.00	10715.00			MinPt-CtCt	
2647.03	143.19	2550.92	2503.85	28.10	OSF1.50	15160.00	10715.00			MinPt-CtCt	
2647.60	145.16	2550.16	2502.44	27.72	OSF1.50	15250.00	10715.00			MINPT-O-EOU	
2648.48	146.22	2550.34	2502.26	27.52	OSF1.50	15300.00	10715.00			MinPt-O-ADP	
2650.80	156.85	2545.57	2493.95	25.66	OSF1.50	15630.00	10715.00			MinPt-CtCt	
2648.22	175.05	2530.86	2473.17	22.93	OSF1.50	16250.00	10715.00			MinPt-CtCt	
2647.96	184.14	2524.54	2463.82	21.79	OSF1.50	16560.00	10715.00			MinPt-CtCt	
2647.81	189.17	2521.04	2456.64	21.20	OSF1.50	16730.00	10715.00			MinPt-CtCt	
2640.59	230.41	2486.32	2410.18	17.33	OSF1.50	18120.00	10715.00			MinPt-CtCt	
2641.24	232.42	2485.63	2406.81	17.18	OSF1.50	18210.00	10715.00			MINPT-O-EOU	
2639.98	303.24	2437.16	2336.74	13.13	OSF1.50	20550.00	10715.00			MinPt-CtCt	
2640.04	303.47	2437.07	2336.57	13.13	OSF1.50	20570.00	10715.00			MINPT-O-EOU	
2640.13	303.58	2437.09	2336.55	13.12	OSF1.50	20580.00	10715.00			MinPt-O-ADP	
2643.63	304.51	2439.96	2339.12	13.10	OSF1.50	20690.00	10715.00			MinPt-O-SF	
2649.93	304.90	2446.01	2345.03	13.11	OSF1.50	20780.56	10715.00			TD	

Cinarex Vaca Draw 20-17

Federal #SH Final

MWD/Surcon Corrected) (Def
Survey)

Pass

1421.09	32.81	1419.11	1388.28	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
1421.07	32.81	1419.07	1388.26	72604.74	MAS = 10.00 (m)	23.00	23.00			WRP	
1419.17	32.81	1414.99	1386.36	643.12	MAS = 10.00 (m)	540.00	540.00			MinPts	
1419.26	32.81	1414.20	1386.45	460.08	MAS = 10.00 (m)	750.00	750.00			MinPts	
1419.49	32.81	1413.85	1386.66	387.59	MAS = 10.00 (m)	870.00	870.00			MINPT-O-EOU	
1421.50	32.81	1412.36	1388.70	198.01	MAS = 10.00 (m)	1650.00	1650.00			MinPts	
1421.59	32.81	1412.23	1388.76	192.23	MAS = 10.00 (m)	1700.00	1700.00			MINPT-O-EOU	
1439.90	32.81	1426.82	1407.09	129.51	MAS = 10.00 (m)	2600.00	2599.98			MinPt-O-SF	
1472.21	32.81	1459.28	1439.40	134.03	MAS = 10.00 (m)	2900.00	2898.70			MinPts	
1584.04	32.81	1570.66	1551.24	138.71	MAS = 10.00 (m)	3560.00	3552.28			MinPt-O-SF	
2061.58	33.08	2038.87	2028.51	99.35	OSF1.50	6590.37	6553.15			MinPt-CtCt	
2102.95	36.54	2077.93	2066.41	91.18	OSF1.50	8400.00	8361.49			MINPT-O-EOU	
2103.23	37.42	2077.62	2065.81	88.93	OSF1.50	8610.00	8571.49			MinPt-CtCt	
2103.55	37.79	2077.70	2065.76	88.02	OSF1.50	8700.00	8661.49			MINPT-O-EOU	
2110.46	41.13	2082.38	2069.33	80.76	OSF1.50	9430.00	9391.49			MinPt-O-ADP	
2140.08	42.73	2110.94	2097.36	78.71	OSF1.50	9880.00	9841.49			MinPt-O-SF	

Offset Trajectory		Separation		Allow	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	MD (ft)			TVD (ft)	Alert	Minor	Major		
2361.29	46.36	2329.73	2314.94	79.75	OSF1.50	10880.00	10692.84				MinPls	
2337.42	52.97	2301.44	2284.44	68.70	OSF1.50	11490.00	10715.00				MinPt-CtCt	
2337.73	53.93	2301.11	2283.80	67.44	OSF1.50	11560.00	10715.00				MINPT-O-EOU	
2329.44	64.02	2286.10	2285.42	56.27	OSF1.50	12080.00	10715.00				MinPt-CtCt	
2329.66	64.62	2285.92	2285.03	55.74	OSF1.50	12120.00	10715.00				MINPT-O-EOU	
2329.90	64.92	2285.96	2284.98	55.48	OSF1.50	12140.00	10715.00				MinPt-O-ADP	
2327.92	84.09	2271.20	2243.83	42.49	OSF1.50	12910.00	10715.00				MinPt-CtCt	
2328.70	86.65	2270.27	2242.05	41.22	OSF1.50	13030.00	10715.00				MINPT-O-EOU	
2329.39	87.48	2270.41	2241.91	40.83	OSF1.50	13070.00	10715.00				MinPt-O-ADP	
2322.63	109.10	2249.24	2213.53	32.50	OSF1.50	13840.00	10715.00				MinPt-CtCt	
2323.06	110.27	2248.88	2212.79	32.15	OSF1.50	13900.00	10715.00				MINPT-O-EOU	
2323.38	110.66	2248.94	2212.72	32.04	OSF1.50	13920.00	10715.00				MinPt-O-ADP	
2331.05	126.88	2245.81	2204.17	27.97	OSF1.50	14490.00	10715.00				MINPT-O-EOU	
2334.61	132.02	2245.94	2202.59	26.91	OSF1.50	14670.00	10715.00				MINPT-O-EOU	
2323.27	152.57	2220.90	2170.70	23.12	OSF1.50	15360.00	10715.00				MinPt-CtCt	
2324.08	158.97	2217.44	2165.11	22.19	OSF1.50	15580.00	10715.00				MinPt-CtCt	
2316.09	196.06	2184.73	2120.03	17.89	OSF1.50	16840.00	10715.00				MinPt-CtCt	
2320.83	210.51	2179.83	2110.32	16.68	OSF1.50	17350.00	10715.00				MINPT-O-EOU	
2325.67	219.09	2178.95	2106.58	16.05	OSF1.50	17640.00	10715.00				MINPT-O-EOU	
2328.25	224.47	2177.95	2103.78	15.68	OSF1.50	17820.00	10715.00				MINPT-O-EOU	
2330.73	230.73	2176.26	2100.01	15.27	OSF1.50	18030.00	10715.00				MINPT-O-EOU	
2331.26	231.53	2176.25	2099.73	15.22	OSF1.50	18060.00	10715.00				MINPT-O-EOU	
2322.17	273.23	2139.35	2048.94	12.83	OSF1.50	19430.00	10715.00				MinPt-CtCt	
2324.72	279.00	2138.07	2045.73	12.58	OSF1.50	19650.00	10715.00				MINPT-O-EOU	
2333.70	290.18	2139.58	2043.52	12.14	OSF1.50	20030.00	10715.00				MinPt-O-ADP	
2327.51	306.77	2122.34	2020.74	11.44	OSF1.50	20550.00	10715.00				MinPt-CtCt	
2327.60	307.01	2122.27	2020.59	11.44	OSF1.50	20570.00	10715.00				MINPT-O-EOU	
2327.70	307.12	2122.30	2020.58	11.43	OSF1.50	20580.00	10715.00				MinPt-O-ADP	
2330.10	307.81	2124.23	2022.29	11.42	OSF1.50	20660.00	10715.00				MinPt-O-SF	
2338.88	308.20	2132.76	2030.69	11.45	OSF1.50	20780.56	10715.00				TD	

Cimarex Vaca Draw 20-17
Federal #1H ST01 0ft-21966ft
(Def Survey)

1441.06	32.81	1439.93	1408.25	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
1441.01	32.81	1439.85	1408.21	47442.99	MAS = 10.00 (m)	23.00	23.00	WRP	
1439.16	32.81	1436.80	1406.35	1178.81	MAS = 10.00 (m)	300.00	300.00	MinPls	
1439.58	32.81	1436.51	1406.77	743.95	MAS = 10.00 (m)	430.00	430.00	MINPT-O-EOU	
1489.90	32.81	1477.68	1457.09	134.27	MAS = 10.00 (m)	2600.00	2599.98	MinPt-O-SF	
1523.77	32.81	1511.64	1490.96	138.52	MAS = 10.00 (m)	2900.00	2898.70	MinPls	
1621.50	32.81	1609.02	1588.69	142.82	MAS = 10.00 (m)	3470.00	3463.15	MinPt-O-SF	
1637.60	32.81	1625.01	1604.79	142.74	MAS = 10.00 (m)	3560.00	3552.28	MinPt-O-SF	
2177.45	32.81	2155.31	2144.64	103.61	MAS = 10.00 (m)	6590.37	6553.15	MinPt-O-SF	
2252.59	36.82	2227.67	2215.77	94.82	OSF1.50	8390.00	8351.49	MINPT-O-EOU	
2253.04	37.41	2227.73	2215.64	93.11	OSF1.50	8530.00	8491.49	MinPt-O-ADP	
2257.77	41.68	2229.61	2216.09	83.47	OSF1.50	9570.00	9531.49	MinPt-CtCt	
2240.69	47.41	2208.70	2193.28	72.59	OSF1.50	10690.00	10601.54	MinPt-CtCt	
2240.71	47.46	2208.70	2193.25	72.51	OSF1.50	10700.00	10607.94	MinPls	
2340.85	51.41	2306.20	2289.43	69.79	OSF1.50	11370.00	10715.00	MinPt-O-SF	
2355.91	51.73	2321.04	2304.18	69.80	OSF1.50	11420.00	10715.00	MinPt-O-SF	
2769.36	71.48	2721.32	2697.87	59.02	OSF1.50	12320.00	10715.00	MinPls	
2770.56	77.20	2718.72	2693.37	54.61	OSF1.50	12510.00	10715.00	MinPt-CtCt	
2770.45	81.03	2716.05	2689.42	51.99	OSF1.50	12660.00	10715.00	MinPt-CtCt	
2767.70	86.55	2709.62	2681.15	48.58	OSF1.50	12870.00	10715.00	MinPt-CtCt	

Offset Trajectory	Separation		Allow	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor		
2767.85	92.92	2705.53	2674.94	45.22	OSF1.50	13110.00	10715.00			MinPt-CtCt	
2769.34	98.53	2703.28	2670.81	42.63	OSF1.50	13330.00	10715.00			MINPT-O-EOU	
2769.86	99.18	2703.36	2670.69	42.36	OSF1.50	13380.00	10715.00			MinPt-O-ADP	
2756.18	135.95	2665.18	2620.24	30.65	OSF1.50	14650.00	10715.00			MinPt-CtCt	
2756.72	137.54	2664.65	2619.18	30.30	OSF1.50	14720.00	10715.00			MINPT-O-EOU	
2762.08	147.04	2663.67	2615.04	28.38	OSF1.50	15050.00	10715.00			MINPT-O-EOU	
2764.01	149.39	2664.04	2614.62	27.95	OSF1.50	15140.00	10715.00			MinPt-O-ADP	
2780.90	166.65	2669.42	2614.25	25.19	OSF1.50	15700.00	10715.00			MinPt-CtCt	
2782.81	174.36	2666.19	2608.45	24.09	OSF1.50	15980.00	10715.00			MINPT-O-EOU	
2784.50	176.40	2666.53	2608.10	23.82	OSF1.50	16060.00	10715.00			MinPt-O-ADP	
2762.96	207.38	2624.33	2555.58	20.09	OSF1.50	17080.00	10715.00			MinPt-CtCt	
2763.30	208.43	2623.97	2554.87	19.99	OSF1.50	17130.00	10715.00			MINPT-O-EOU	
2763.81	209.05	2624.07	2554.76	19.93	OSF1.50	17180.00	10715.00			MinPt-O-ADP	
2796.59	231.60	2641.82	2564.99	18.19	OSF1.50	17890.00	10715.00			MinPt-CtCt	
2780.07	257.52	2588.01	2502.55	16.14	OSF1.50	18780.00	10715.00			MinPt-CtCt	
2761.57	262.91	2585.92	2496.66	15.82	OSF1.50	18960.00	10715.00			MINPT-O-EOU	
2764.81	267.98	2585.78	2496.83	15.53	OSF1.50	19130.00	10715.00			MINPT-O-EOU	
2766.75	270.41	2586.10	2496.34	15.41	OSF1.50	19220.00	10715.00			MinPt-O-ADP	
2771.73	277.68	2586.23	2494.05	15.03	OSF1.50	19450.00	10715.00			MINPT-O-EOU	
2766.89	289.09	2573.78	2477.79	14.41	OSF1.50	19810.00	10715.00			MinPt-CtCt	
2768.08	293.28	2572.18	2474.79	14.21	OSF1.50	19970.00	10715.00			MINPT-O-EOU	
2769.29	294.75	2572.42	2474.54	14.14	OSF1.50	20030.00	10715.00			MinPt-O-ADP	
2771.72	298.49	2572.35	2473.23	13.98	OSF1.50	20140.00	10715.00			MINPT-O-EOU	
2772.23	299.11	2572.44	2473.11	13.95	OSF1.50	20170.00	10715.00			MinPt-O-ADP	
2774.75	311.33	2566.82	2463.42	13.41	OSF1.50	20550.00	10715.00			MinPt-CtCt	
2774.92	311.85	2566.64	2463.07	13.39	OSF1.50	20580.00	10715.00			MINPT-O-EOU	
2775.05	312.01	2566.66	2463.03	13.38	OSF1.50	20590.00	10715.00			MinPt-O-ADP	
2783.51	314.29	2573.60	2469.21	13.33	OSF1.50	20770.00	10715.00			MinPt-O-SF	
2784.36	314.39	2574.39	2469.98	13.33	OSF1.50	20780.56	10715.00			TD	

Cimarex Vaca Draw 20-17
Federal #1H Surcon 0ft-12740
(Def Survey)

Pass

1441.06	32.81	1439.08	1408.25	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
1441.01	32.81	1439.00	1408.21	47415.33	MAS = 10.00 (m)	23.00	23.00			WRP	
1439.16	32.81	1435.96	1406.35	1178.11	MAS = 10.00 (m)	300.00	300.00			MinPts	
1439.58	32.81	1435.67	1406.77	743.51	MAS = 10.00 (m)	430.00	430.00			MINPT-O-EOU	
1489.90	32.81	1476.83	1457.08	134.19	MAS = 10.00 (m)	2600.00	2599.98			MinPt-O-SF	
1523.77	32.81	1510.79	1490.96	138.45	MAS = 10.00 (m)	2900.00	2898.70			MinPts	
1621.50	32.81	1608.17	1588.69	142.74	MAS = 10.00 (m)	3470.00	3463.15			MinPt-O-SF	
1637.60	32.81	1624.16	1604.79	142.67	MAS = 10.00 (m)	3560.00	3552.28			MinPt-O-SF	
2177.45	33.49	2154.47	2143.96	103.57	OSF1.50	6590.37	6563.15			MinPt-O-SF	
2252.59	37.67	2226.82	2214.92	94.59	OSF1.50	8390.00	8351.49			MINPT-O-EOU	
2253.04	38.26	2226.88	2214.79	93.08	OSF1.50	8530.00	8491.49			MinPt-O-ADP	
2257.77	42.53	2228.76	2215.24	83.44	OSF1.50	9570.00	9531.49			MinPt-CtCt	
2240.68	48.26	2207.85	2192.43	72.56	OSF1.50	10690.00	10601.54			MinPt-CtCt	
2240.71	48.31	2207.85	2192.40	72.48	OSF1.50	10700.00	10607.94			MinPts	
2340.85	52.26	2305.35	2288.59	69.77	OSF1.50	11370.00	10715.00			MinPt-O-SF	
2355.91	52.58	2320.19	2303.33	69.78	OSF1.50	11420.00	10715.00			MinPt-O-SF	
10338.06	63.34	10295.17	10274.72	252.65	OSF1.50	20780.56	10715.00			TD	

Cimarex Vaca Draw 20-17
Federal #1H Rev0 RM
10Apr17 (Non-Def Plan)

Pass

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)		
1441.06	32.81	1439.08	1408.25	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	
1441.06	32.81	1439.07	1408.25	102809.64	MAS = 10.00 (m)	23.00	23.00	WRP	
1441.06	32.81	1423.73	1408.25	93.74	MAS = 10.00 (m)	2500.00	2500.00	MinPts	
1441.08	32.81	1423.70	1408.27	93.47	MAS = 10.00 (m)	2510.00	2510.00	MINPT-O-EOU	
1468.67	32.81	1449.98	1435.86	87.77	MAS = 10.00 (m)	2900.00	2898.70	MINPT-O-EOU	
1979.89	55.35	1942.32	1924.53	55.58	OSF1.50	6600.00	6562.70	MinPt-O-SF	
1999.70	85.51	1942.04	1914.20	35.88	OSF1.50	10680.00	10594.99	MinPt-CtCt	
1999.75	85.63	1942.00	1914.12	35.82	OSF1.50	10700.00	10607.94	MinPts	
2011.71	86.89	1953.13	1924.82	35.50	OSF1.50	10930.00	10705.37	MinPt-O-SF	
10266.05	93.88	10202.80	10172.16	167.53	OSF1.50	20780.56	10715.00	TD	

Cimarex Vaca Draw 20-17
Federal #58H Rev1 RM
09Feb21 (Def Plan)

2359.39	32.81	2358.10	2326.58	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
2359.33	32.81	2358.04	2326.52	343736.05	MAS = 10.00 (m)	10.00	10.00	MinPt-O-SF	
2359.32	32.81	2358.03	2326.51	N/A	MAS = 10.00 (m)	23.00	23.00	WRP	
2309.87	32.81	2291.48	2277.06	135.25	MAS = 10.00 (m)	3060.00	3057.14	MinPt-O-SF	
1658.71	66.41	1613.72	1592.30	38.67	OSF1.50	10320.00	10281.43	MinPt-CtCt	
1658.90	67.36	1613.28	1591.54	38.11	OSF1.50	10440.00	10398.29	MINPT-O-EOU	
1659.03	67.51	1613.31	1591.52	38.02	OSF1.50	10460.00	10416.97	MinPt-O-ADP	
1682.93	69.90	1635.66	1613.03	37.14	OSF1.50	10830.00	10675.31	MinPt-O-SF	
2325.05	329.25	2105.12	1995.80	10.63	OSF1.50	20780.56	10715.00	MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #71H
MWD 0ft-19978ft (Surcon
Corrected) (Def Survey)

2889.10	32.81	2887.82	2856.29	N/A	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
2889.06	32.81	2887.76	2856.25	515468.96	MAS = 10.00 (m)	10.00	10.00	MinPt-O-SF	
2889.04	32.81	2887.76	2856.24	N/A	MAS = 10.00 (m)	20.00	20.00	MinPts	
2889.05	32.81	2887.76	2856.24	N/A	MAS = 10.00 (m)	23.00	23.00	WRP	
2889.43	32.81	2887.60	2856.62	5320.90	MAS = 10.00 (m)	170.00	170.00	MINPT-O-EOU	
2886.31	32.81	2880.08	2853.50	583.50	MAS = 10.00 (m)	1060.00	1060.00	MINPT-O-EOU	
2090.38	33.71	2057.24	2046.67	98.34	OSF1.50	6700.00	6661.99	MinPt-O-SF	
1734.64	43.97	1704.40	1690.67	63.07	OSF1.50	9380.00	9341.49	MinPt-O-SF	
1683.91	46.80	1651.74	1637.11	57.44	OSF1.50	9860.00	9821.49	MinPt-CtCt	
1683.94	46.86	1651.73	1637.08	57.36	OSF1.50	9870.00	9831.49	MinPts	
1699.96	47.85	1667.13	1652.11	56.49	OSF1.50	10110.00	10071.49	MinPt-O-SF	
1864.42	55.27	1826.92	1809.15	52.39	OSF1.50	11350.00	10715.00	MinPt-CtCt	
1864.14	59.43	1823.88	1804.72	48.60	OSF1.50	11590.00	10715.00	MinPt-CtCt	
1864.05	65.64	1819.64	1798.41	43.86	OSF1.50	11900.00	10715.00	MinPt-CtCt	
1831.43	90.49	1770.42	1740.94	31.02	OSF1.50	12930.00	10715.00	MinPt-CtCt	
1832.73	116.17	1754.61	1716.56	24.06	OSF1.50	13880.00	10715.00	MinPt-CtCt	
1829.49	139.35	1735.91	1690.14	19.96	OSF1.50	15110.00	10715.00	MinPt-CtCt	
1827.56	151.17	1726.10	1676.40	18.36	OSF1.50	15380.00	10715.00	MinPt-CtCt	
1826.60	159.00	1719.92	1667.60	17.44	OSF1.50	16290.00	10715.00	MinPt-CtCt	
1828.16	185.58	1703.76	1642.58	14.92	OSF1.50	16290.00	10715.00	MinPt-CtCt	
1822.80	196.24	1691.30	1626.57	14.06	OSF1.50	16650.00	10715.00	MinPt-CtCt	
1823.41	198.19	1690.61	1625.22	13.93	OSF1.50	16730.00	10715.00	MinPt-CtCt	
1824.23	199.15	1690.79	1625.08	13.87	OSF1.50	16770.00	10715.00	MINPT-O-EOU	
1823.34	220.82	1675.45	1602.52	12.49	OSF1.50	17480.00	10715.00	MinPt-O-ADP	
1824.56	226.94	1672.59	1597.62	12.15	OSF1.50	17700.00	10715.00	MINPT-O-EOU	
1826.10	228.77	1672.91	1597.33	12.07	OSF1.50	17770.00	10715.00	MinPt-O-ADP	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Minor	Major		
1830.66	233.21	1674.52	1597.45	11.86	OSF1.50	17920.00	10715.00			MinPt-O-ADP	
1839.48	244.60	1675.74	1594.89	11.36	OSF1.50	18280.00	10715.00			MinPt-CtCt	
1841.38	262.23	1665.89	1579.15	10.60	OSF1.50	18870.00	10715.00			MinPt-CtCt	
1841.38	267.03	1662.69	1574.35	10.41	OSF1.50	19030.00	10715.00			MinPt-CtCt	
1840.91	283.82	1651.03	1557.10	9.79	OSF1.50	19590.00	10715.00			MinPt-CtCt	
1844.44	319.49	1630.78	1524.95	8.70	OSF1.50	20780.00	10715.00			MinPt-CtCt	
1844.44	319.50	1630.77	1524.94	8.70	OSF1.50	20780.56	10715.00			MinPls	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #72H
Surveys Off to 19073ft (Surcon
Corrected) (Def Survey)

2909.10	32.81	2907.81	2876.29	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	Pass
2909.05	32.81	2907.76	2876.25	492595.03	MAS = 10.00 (m)	10.00	10.00			MinPt-O-SF	
2909.04	32.81	2907.75	2876.23	N/A	MAS = 10.00 (m)	23.00	23.00			WRP	
2906.61	32.81	2900.59	2873.81	613.91	MAS = 10.00 (m)	1060.00	1060.00			MINPT-O-EOU	
2894.15	32.81	2871.20	2851.34	244.21	MAS = 10.00 (m)	2610.00	2609.97			MinPt-O-SF	
2732.29	32.81	2718.34	2699.48	215.53	MAS = 10.00 (m)	4080.00	4067.22			MinPt-O-SF	
2297.33	33.48	2274.42	2263.85	108.62	OSF1.50	6600.00	6562.70			MinPt-O-SF	
2275.10	32.81	2253.08	2242.29	112.53	MAS = 10.00 (m)	6940.00	6901.49			MinPls	
2279.08	34.18	2255.69	2244.90	105.53	OSF1.50	7710.00	7671.49			MinPt-CtCt	
2279.25	34.69	2255.52	2244.56	103.91	OSF1.50	7850.00	7811.49			MINPT-O-EOU	
2276.05	36.99	2249.45	2237.06	91.78	OSF1.50	8790.00	8751.49			MinPt-CtCt	
2276.08	39.08	2249.42	2237.00	91.56	OSF1.50	8810.00	8771.49			MINPT-O-EOU	
2276.12	39.12	2249.43	2237.00	91.45	OSF1.50	8820.00	8781.49			MinPt-O-ADP	
2335.47	41.56	2307.25	2293.91	87.46	OSF1.50	9470.00	9431.49			MinPt-O-SF	
2617.36	43.02	2588.34	2574.34	93.44	OSF1.50	10330.00	10291.37			MinPt-O-SF	
2754.62	51.81	2719.73	2702.80	81.32	OSF1.50	11350.00	10715.00			MinPt-CtCt	
2754.67	53.12	2718.93	2701.55	79.22	OSF1.50	11430.00	10715.00			MinPt-CtCt	
2755.03	54.19	2718.57	2700.84	77.64	OSF1.50	11500.00	10715.00			MINPT-O-EOU	
2755.43	54.67	2718.65	2700.76	76.96	OSF1.50	11530.00	10715.00			MinPt-O-ADP	
2720.52	87.21	2662.05	2633.31	47.31	OSF1.50	12930.00	10715.00			MinPt-CtCt	
2714.37	106.10	2643.31	2608.27	38.72	OSF1.50	13630.00	10715.00			MinPt-CtCt	
2713.39	118.72	2633.91	2594.67	34.56	OSF1.50	14080.00	10715.00			MinPt-CtCt	
2721.52	136.08	2630.47	2585.44	30.21	OSF1.50	14770.00	10715.00			MINPT-O-EOU	
2722.72	137.55	2630.68	2585.17	29.89	OSF1.50	14770.00	10715.00			MinPt-O-ADP	
2720.63	180.63	2599.88	2540.00	22.71	OSF1.50	16220.00	10715.00			MinPt-CtCt	
2706.21	200.66	2572.11	2505.55	20.32	OSF1.50	16900.00	10715.00			MinPt-CtCt	
2706.81	202.57	2571.44	2504.24	20.13	OSF1.50	16980.00	10715.00			MINPT-O-EOU	
2707.79	203.74	2571.63	2504.05	20.03	OSF1.50	17030.00	10715.00			MinPt-O-ADP	
2720.75	213.41	2578.15	2507.34	19.20	OSF1.50	17350.00	10715.00			MINPT-O-EOU	
2722.27	215.22	2578.46	2507.05	19.05	OSF1.50	17420.00	10715.00			MinPt-O-ADP	
2726.90	242.84	2564.67	2484.05	16.91	OSF1.50	18320.00	10715.00			MinPt-CtCt	
2728.41	247.04	2563.39	2481.37	16.63	OSF1.50	18480.00	10715.00			MINPT-O-EOU	
2730.39	249.44	2563.76	2480.94	16.48	OSF1.50	18570.00	10715.00			MinPt-O-ADP	
2709.97	293.43	2514.02	2416.54	13.89	OSF1.50	20010.00	10715.00			MinPt-CtCt	
2714.55	306.75	2509.73	2407.81	13.31	OSF1.50	20470.00	10715.00			MINPT-O-EOU	
2715.11	307.40	2509.85	2407.71	13.29	OSF1.50	20500.00	10715.00			MinPt-O-ADP	
2729.07	315.27	2518.56	2413.80	13.02	OSF1.50	20780.56	10715.00			MinPls	

Cimarex Vaca Draw 20-17
Federal #59H Rev1 RM
09Feb21 (Def Plan)

2379.38	32.81	2377.40	2346.57	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	Pass
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Offset Trajectory	Separation		Allow	Sep.	Controlling	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)			MD (ft)	TVD (ft)	Alert	Minor		
2379.33	32.81	2377.34	2346.52	341165.64	MAS = 10.00 (m)	10.00	10.00			MinPt-O-SF	
2379.31	32.81	2377.33	2346.50	N/A	MAS = 10.00 (m)	23.00	23.00			WRP	
2375.53	32.81	2388.04	2342.73	152.95	MAS = 10.00 (m)	2700.00	2699.84			MinPt-O-SF	
2365.48	32.81	2348.12	2332.67	153.80	MAS = 10.00 (m)	2900.00	2898.70			MinPt-O-SF	
2340.24	43.89	2310.31	2296.35	83.72	OSF1.50	8600.00	8582.70			MinPis	
2345.10	44.05	2315.08	2301.06	83.57	OSF1.50	6770.00	6731.71			MinPt-O-SF	
2343.60	42.35	2314.69	2301.25	87.12	OSF1.50	8990.00	8951.49			MinPis	
2343.60	61.66	2301.82	2281.94	58.91	OSF1.50	10290.00	10251.49			MinPt-CtCt	
2343.81	62.78	2301.28	2281.03	57.83	OSF1.50	10450.00	10407.67			MINPT-O-EOU	
2343.92	62.91	2301.30	2281.01	57.70	OSF1.50	10470.00	10426.20			MinPt-O-ADP	
2476.78	68.82	2430.24	2407.96	55.54	OSF1.50	11350.00	10715.00			MinPt-O-SF	
2970.23	325.53	2752.55	2644.70	13.76	OSF1.50	20780.56	10715.00			MinPis	
Final Surveys - Cimarex Vaca											
Draw 20-17 Federal #73H											
ST01 Off- 19710ft (Surcon											
Corrected) (Def Survey)											
2929.10	32.81	2927.81	2896.29	N/A	MAS = 10.00 (m)	0.00	0.00			Surface	
2929.05	32.81	2927.76	2896.24	505198.64	MAS = 10.00 (m)	10.00	10.00			MinPt-O-SF	
2929.04	32.81	2927.75	2896.23	N/A	MAS = 10.00 (m)	23.00	23.00			WRP	
2928.75	32.81	2926.29	2895.94	2511.31	MAS = 10.00 (m)	310.00	310.00			MinPis	
2928.00	32.81	2923.26	2895.19	847.68	MAS = 10.00 (m)	820.00	820.00			MinPis	
2928.16	32.81	2923.06	2895.35	768.70	MAS = 10.00 (m)	910.00	910.00			MINPT-O-EOU	
2908.90	32.81	2895.55	2876.09	238.21	MAS = 10.00 (m)	3020.00	3017.53			MinPt-O-SF	
2858.38	32.81	2844.40	2825.57	223.44	MAS = 10.00 (m)	3550.00	3542.38			MinPt-O-SF	
2836.60	32.81	2822.46	2803.79	219.36	MAS = 10.00 (m)	3790.00	3780.04			MinPt-O-SF	
2769.18	32.81	2753.83	2736.38	196.71	MAS = 10.00 (m)	4480.00	4463.33			MinPt-O-SF	
2464.65	33.49	2441.78	2431.15	115.95	OSF1.50	6600.00	6562.70			MinPt-O-SF	
2433.48	32.84	2411.02	2400.64	117.08	OSF1.50	7330.00	7291.49			MinPt-CtCt	
2433.53	33.00	2410.97	2400.54	116.50	OSF1.50	7380.00	7341.49			MINPT-O-EOU	
2433.59	33.06	2410.98	2400.53	116.27	OSF1.50	7400.00	7361.49			MinPt-O-ADP	
2442.45	39.49	2415.57	2402.96	96.79	OSF1.50	9060.00	9021.49			MinPt-O-SF	
2417.17	39.94	2389.97	2377.22	94.71	OSF1.50	9240.00	9201.49			MinPt-O-SF	
2383.63	42.73	2354.56	2340.90	87.16	OSF1.50	9670.00	9631.49			MinPt-CtCt	
2383.65	42.79	2354.54	2340.86	87.03	OSF1.50	9680.00	9641.49			MINPT-O-EOU	
2383.70	42.85	2354.56	2340.86	86.91	OSF1.50	9690.00	9651.49			MinPt-O-ADP	
2459.81	56.92	2421.48	2402.89	66.13	OSF1.50	11510.00	10715.00			MinPt-CtCt	
2459.98	57.39	2421.34	2402.59	65.59	OSF1.50	11540.00	10715.00			MINPT-O-EOU	
2480.24	57.70	2421.39	2402.54	65.24	OSF1.50	11560.00	10715.00			MinPt-O-ADP	
2480.47	62.46	2418.44	2398.02	60.21	OSF1.50	11780.00	10715.00			MinPt-CtCt	
2461.09	64.19	2417.90	2396.90	58.56	OSF1.50	11870.00	10715.00			MINPT-O-EOU	
2465.05	68.51	2418.98	2396.54	54.89	OSF1.50	12070.00	10715.00			MinPt-O-ADP	
2468.17	71.85	2419.88	2396.32	52.36	OSF1.50	12220.00	10715.00			MinPt-O-ADP	
2473.12	75.93	2422.10	2397.18	49.60	OSF1.50	12390.00	10715.00			MINPT-O-EOU	
2474.32	77.27	2422.41	2397.05	48.76	OSF1.50	12450.00	10715.00			MinPt-O-ADP	
2475.08	86.15	2417.23	2388.91	43.68	OSF1.50	12790.00	10715.00			MinPt-CtCt	
2475.83	88.42	2416.49	2387.41	42.56	OSF1.50	12890.00	10715.00			MINPT-O-EOU	
2476.59	89.33	2416.64	2387.26	42.13	OSF1.50	12930.00	10715.00			MinPt-O-ADP	
2437.98	114.90	2360.96	2323.08	32.16	OSF1.50	13850.00	10715.00			MinPt-CtCt	
2438.47	116.24	2360.57	2322.23	31.79	OSF1.50	13910.00	10715.00			MINPT-O-EOU	
2439.56	125.22	2355.66	2314.34	29.50	OSF1.50	14220.00	10715.00			MinPt-CtCt	
2440.11	127.46	2354.72	2312.65	28.98	OSF1.50	14310.00	10715.00			MINPT-O-EOU	
2440.86	128.38	2354.86	2312.46	28.78	OSF1.50	14350.00	10715.00			MinPt-O-ADP	
2446.32	142.62	2350.82	2303.70	25.94	OSF1.50	14830.00	10715.00			MinPt-CtCt	

Offset Trajectory	Separation		Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)				MD (ft)	TVD (ft)	Alert	Minor		
	2446.87	144.29	2350.28	2302.58	25.64	OSF1.50	14900.00	10715.00		MINPT-O-EOU	
	2447.65	145.24	2350.41	2302.41	25.48	OSF1.50	14940.00	10715.00		MinPt-O-ADP	
	2428.70	160.96	2318.97	2285.74	22.78	OSF1.50	15480.00	10715.00		MinPt-CtCt	
	2427.04	162.08	2318.56	2284.96	22.63	OSF1.50	15510.00	10715.00		MINPT-O-EOU	
	2430.28	165.76	2319.35	2284.51	22.15	OSF1.50	15650.00	10715.00		MinPt-O-ADP	
	2437.82	174.52	2321.05	2263.30	21.09	OSF1.50	15940.00	10715.00		MINPT-O-EOU	
	2438.85	175.76	2321.26	2263.09	20.95	OSF1.50	15990.00	10715.00		MinPt-O-ADP	
	2441.89	179.47	2321.83	2262.42	20.54	OSF1.50	16110.00	10715.00		MINPT-O-EOU	
	2444.15	182.18	2322.28	2261.97	20.25	OSF1.50	16210.00	10715.00		MinPt-O-ADP	
	2451.21	187.92	2325.52	2263.30	19.69	OSF1.50	16410.00	10715.00		MinPt-O-ADP	
	2449.71	209.85	2309.39	2239.86	17.61	OSF1.50	17120.00	10715.00		MinPt-CtCt	
	2436.36	245.34	2272.37	2191.02	14.97	OSF1.50	18310.00	10715.00		MinPt-CtCt	
	2432.87	252.83	2283.90	2180.05	14.50	OSF1.50	18560.00	10715.00		MinPt-CtCt	
	2433.93	255.32	2263.30	2178.61	14.36	OSF1.50	18660.00	10715.00		MINPT-O-EOU	
	2440.84	263.30	2264.89	2177.54	13.96	OSF1.50	18940.00	10715.00		MinPt-O-ADP	
	2450.33	271.60	2268.85	2178.73	13.59	OSF1.50	19220.00	10715.00		MinPt-O-ADP	
	2458.29	307.53	2282.86	2150.76	12.03	OSF1.50	20390.00	10715.00		MinPt-CtCt	
	2456.84	319.30	2243.56	2137.54	11.58	OSF1.50	20780.56	10715.00		MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #73H Off-
19583ft (Surcon Corrected)
(Def Survey)

Pass										
2929.10	32.81	2927.81	2896.29	N/A	MAS = 10.00 (m)	0.00	0.00		Surface	
2929.05	32.81	2927.76	2896.24	505198.64	MAS = 10.00 (m)	10.00	10.00		MinPt-O-SF	
2929.04	32.81	2927.75	2896.23	N/A	MAS = 10.00 (m)	23.00	23.00		WRP	
2928.75	32.81	2926.29	2895.94	2511.31	MAS = 10.00 (m)	310.00	310.00		MinPts	
2928.00	32.81	2923.26	2895.19	847.68	MAS = 10.00 (m)	820.00	820.00		MinPts	
2928.16	32.81	2923.08	2895.35	768.70	MAS = 10.00 (m)	910.00	910.00		MINPT-O-EOU	
2908.90	32.81	2895.55	2876.09	238.21	MAS = 10.00 (m)	3017.53	3017.53		MinPt-O-SF	
2858.38	32.81	2844.40	2825.57	223.44	MAS = 10.00 (m)	3550.00	3542.38		MinPt-O-SF	
2836.60	32.81	2822.46	2803.79	219.36	MAS = 10.00 (m)	3790.00	3780.04		MinPt-O-SF	
2769.18	32.81	2753.83	2736.38	196.71	MAS = 10.00 (m)	4480.00	4463.33		MinPt-O-SF	
2464.65	33.49	2441.78	2431.15	115.95	OSF1.50	6600.00	6562.70		MinPt-O-SF	
2433.48	32.84	2411.02	2400.64	117.08	OSF1.50	7330.00	7291.49		MinPt-CtCt	
2433.53	33.00	2410.97	2400.54	116.50	OSF1.50	7380.00	7341.49		MINPT-O-EOU	
2433.59	33.06	2410.98	2400.53	116.27	OSF1.50	7400.00	7361.49		MinPt-O-ADP	
2442.45	39.49	2415.57	2402.96	96.79	OSF1.50	9060.00	9021.49		MinPt-O-SF	
2394.30	42.40	2365.44	2351.89	88.31	OSF1.50	9620.00	9581.49		MinPt-CtCt	
2394.32	42.46	2365.42	2351.86	88.18	OSF1.50	9630.00	9591.49		MINPT-O-EOU	
2394.38	42.52	2365.44	2351.85	88.05	OSF1.50	9640.00	9601.49		MinPt-O-ADP	
2454.56	45.01	2424.09	2409.56	84.38	OSF1.50	10210.00	10171.49		MinPt-O-SF	
2558.19	52.29	2523.00	2505.91	74.82	OSF1.50	11270.00	10715.00		MinPt-CtCt	
2558.47	53.01	2522.79	2505.46	73.78	OSF1.50	11320.00	10715.00		MINPT-O-EOU	
2558.72	53.31	2522.64	2505.41	73.37	OSF1.50	11340.00	10715.00		MinPt-O-ADP	
2536.35	105.17	2465.90	2431.18	36.51	OSF1.50	13490.00	10715.00		MinPt-CtCt	
2536.03	111.93	2461.07	2424.10	34.28	OSF1.50	13730.00	10715.00		MinPt-CtCt	
2537.62	116.84	2459.38	2420.78	32.85	OSF1.50	13920.00	10715.00		MINPT-O-EOU	
2534.57	123.79	2451.70	2410.77	30.95	OSF1.50	14150.00	10715.00		MinPt-CtCt	
2530.08	133.15	2440.97	2396.93	28.71	OSF1.50	14480.00	10715.00		MinPt-CtCt	
2530.85	135.59	2440.12	2395.26	28.20	OSF1.50	14580.00	10715.00		MINPT-O-EOU	
2528.17	163.91	2418.56	2364.26	23.27	OSF1.50	15550.00	10715.00		MinPt-CtCt	
2529.85	174.49	2413.18	2355.36	21.87	OSF1.50	15910.00	10715.00		MinPt-CtCt	
2511.20	210.69	2370.40	2300.51	17.96	OSF1.50	17130.00	10715.00		MinPt-CtCt	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level		Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor		
	2522.29	255.68	2351.50	2266.61	14.85	OSF1.50	18640.00	10715.00			MinPt-CtCt	
	2464.51	307.27	2259.32	2157.23	12.07	OSF1.50	20350.00	10715.00			MinPt-CtCt	
	2465.71	310.98	2288.05	2154.73	11.93	OSF1.50	20490.00	10715.00			MINPT-O-EOU	
	2472.42	319.64	2258.99	2152.78	11.63	OSF1.50	20780.56	10715.00			MinPis	



Cimarex Energy Offline Cementing 7" Casing Information for
Sundry Approval Plan REV0



CIMAREX ENERGY CO. NYSE LISTED: XEC

Cementing Operational Workflow

Conventional Cementing		Offline Cementing	
1.	Land casing on fluted mandrel hanger	1.	Land casing on <u>solid body</u> mandrel hanger
2.	Circulate down casing, taking returns through BOP stack	a)	Engage packoff and locking
3.	Pump lead and tail cement	2.	Install BPV
4.	Displace cement and bump the plug	3.	Skid rig
5.	Ensure floats are holding pressure	4.	Check for pressure and remove BPV
6.	RD cement crew	5.	Circulate down casing, taking returns through casing valves
7.	Install packoff to isolate pressure	6.	Pump lead and tail cement
8.	Install BPV and skid rig	7.	Displace cement and bump the plug
		8.	Ensure floats are holding pressure
		9.	RD cement crew
		10.	Install BPV and TA cap

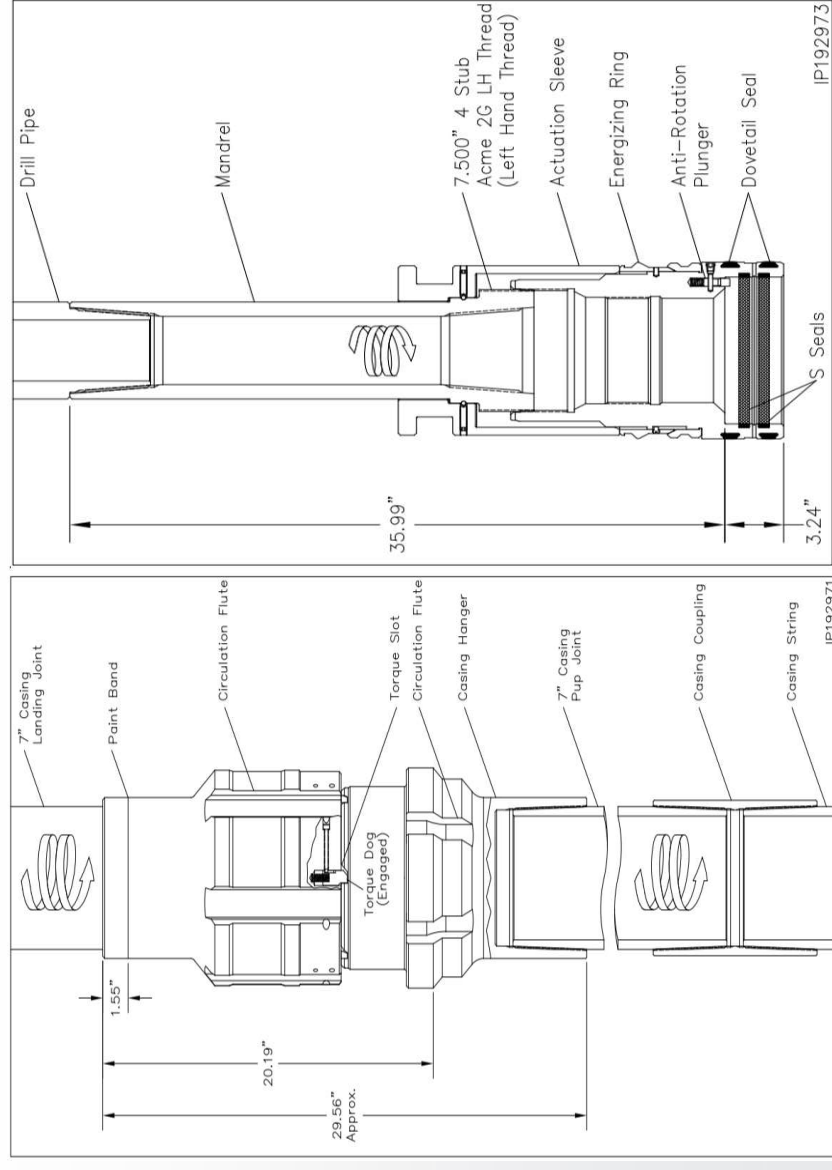


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SLIDE TITLE HERE | 2

Conventional Cementing Equipment-Fluted Mandrel

- Fluted Hanger allows returns up past the hanger body
- Returns throughout cement job flow up through BOP stack and into flowline
- Packoff is installed **after** cement job to isolate pressure above and below hanger
- Lockring engaged during packoff installation

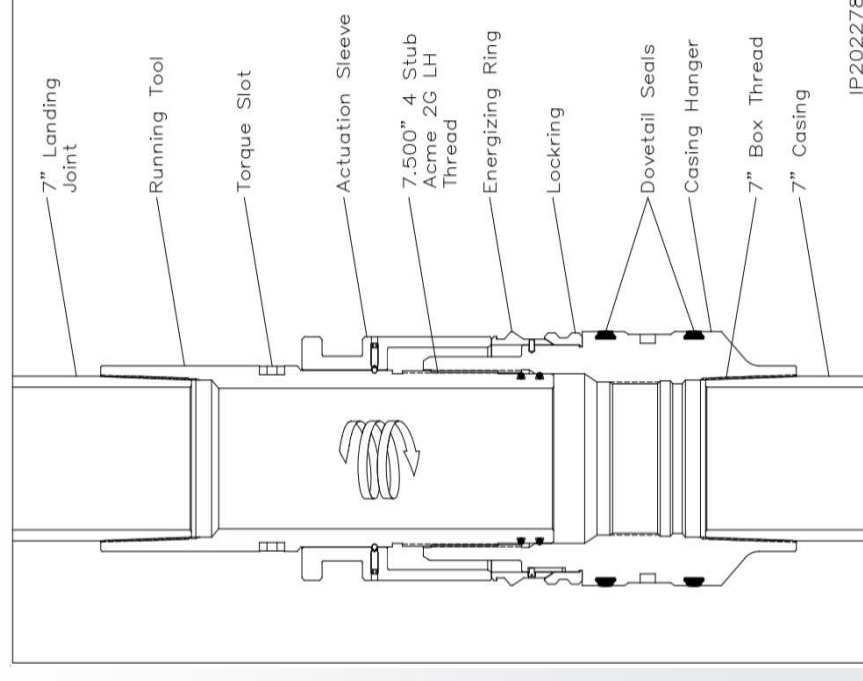


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Offline Cementing Equipment-Solid Body Mandrel Hanger

- Solid Body Mandrel Hanger allows for casing to be landed and pressure isolated in one step, **prior** to cementing
- Lockring is engaged to lock casing in place
- Casing is isolated and returns throughout cement job flow through the casing valves and through flowback iron independent of rig



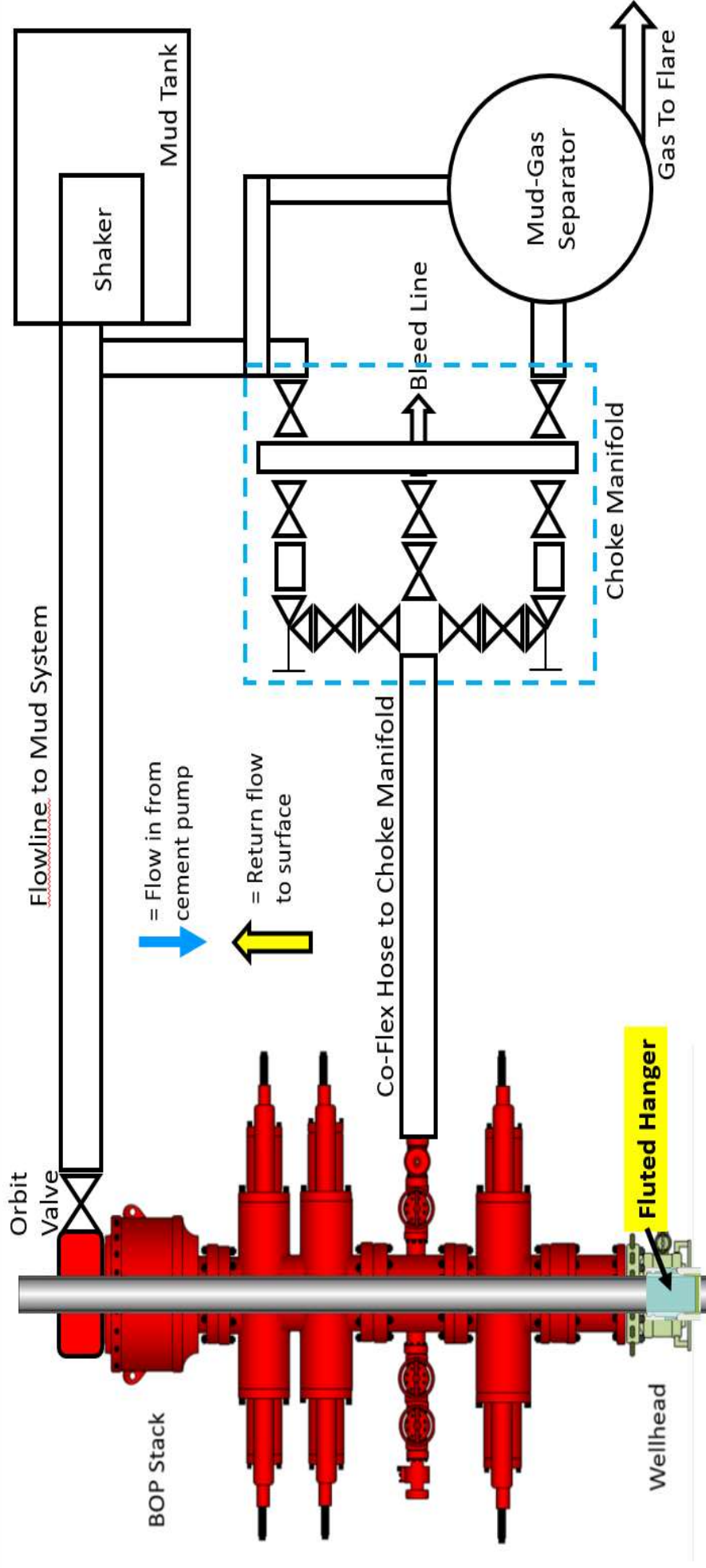
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Conventional Cementing Flow Diagram

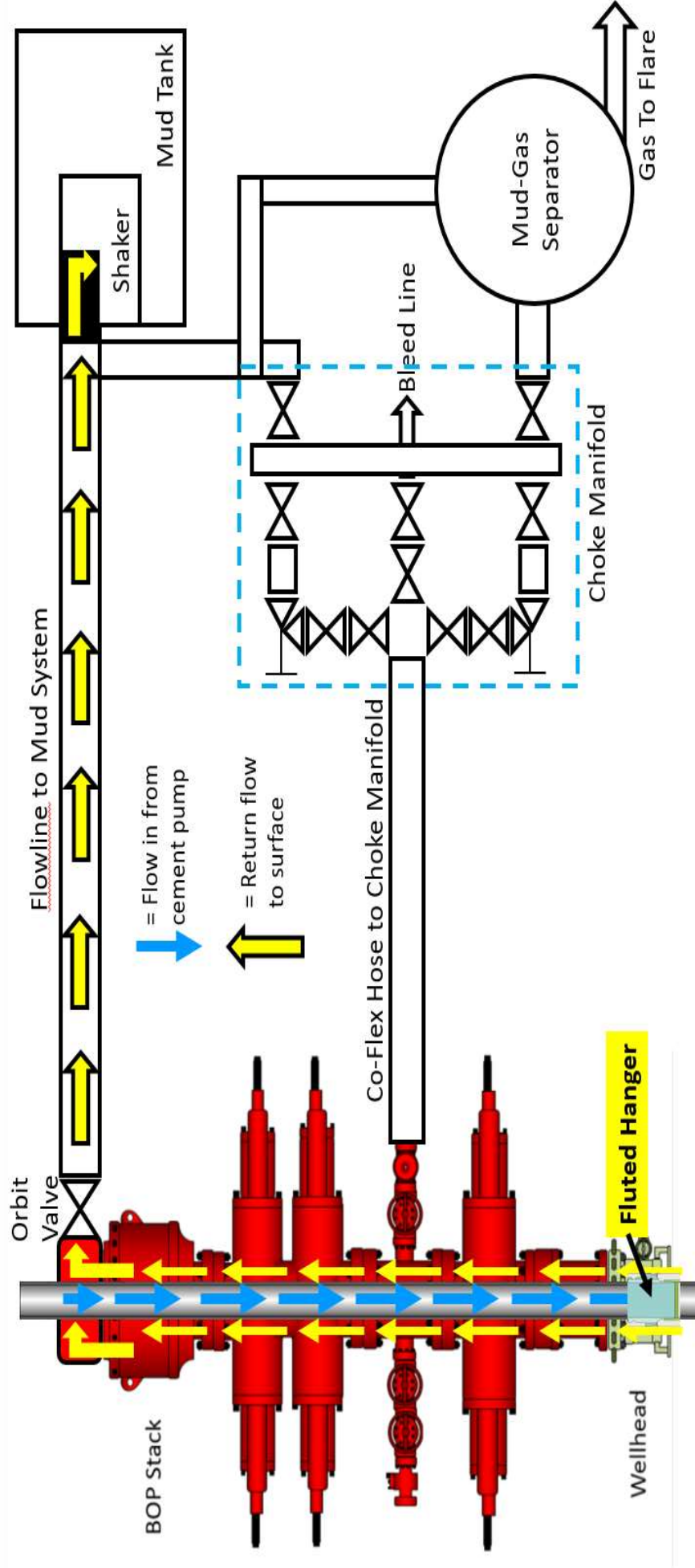


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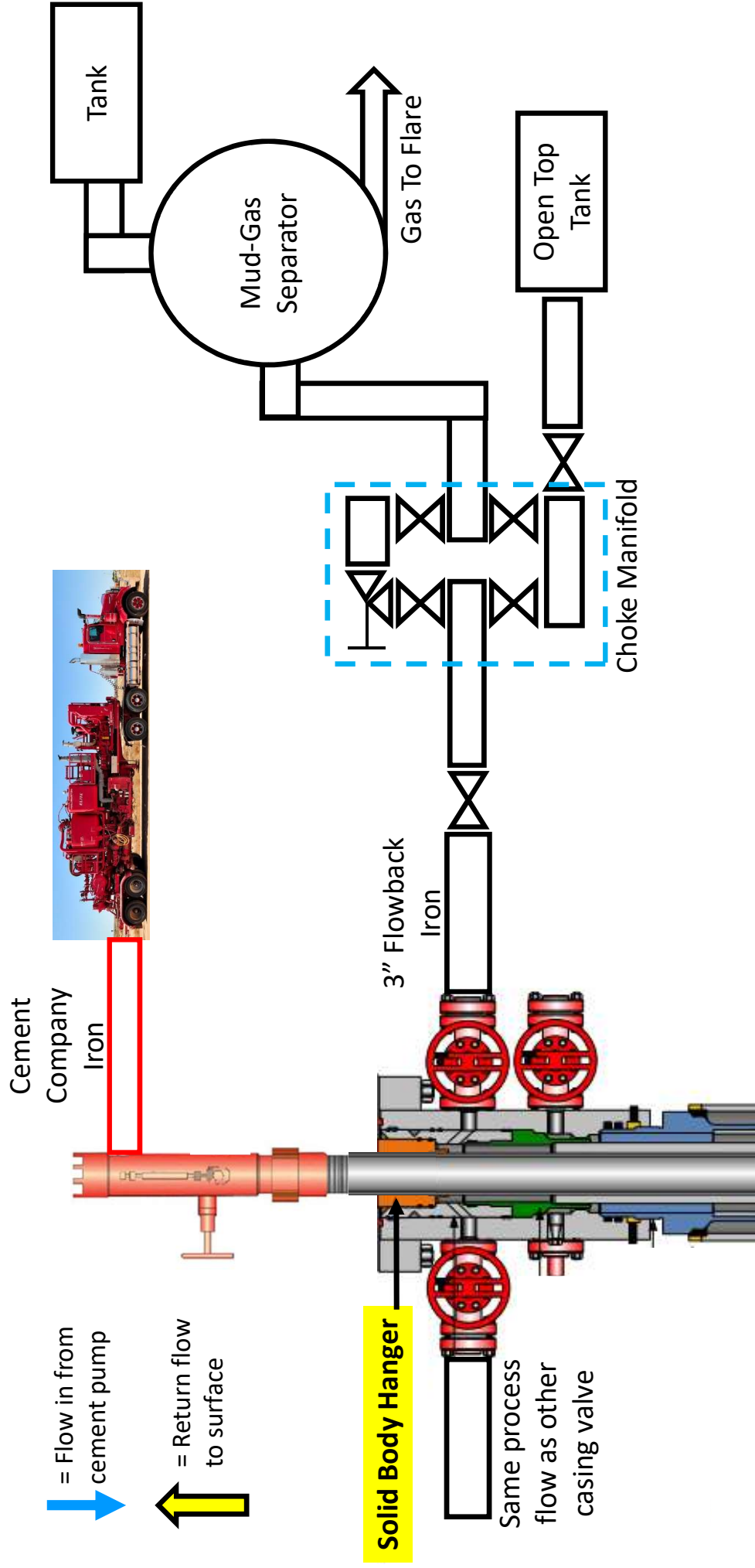
Conventional Cementing Flow Diagram



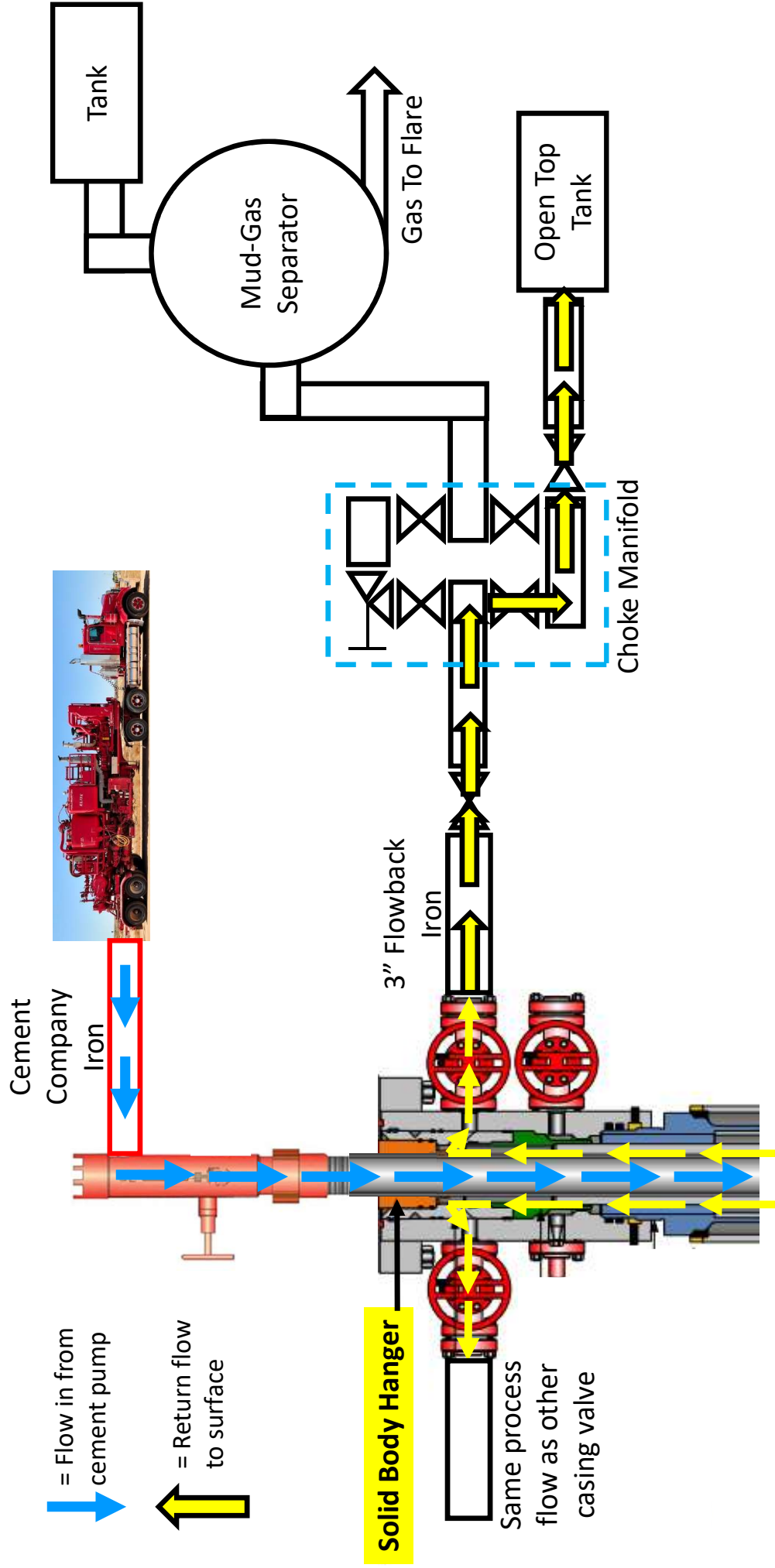
CIMAREX ENERGY CO. NYSE LISTED: XEC

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Offline Cementing -- Intermediate Casing

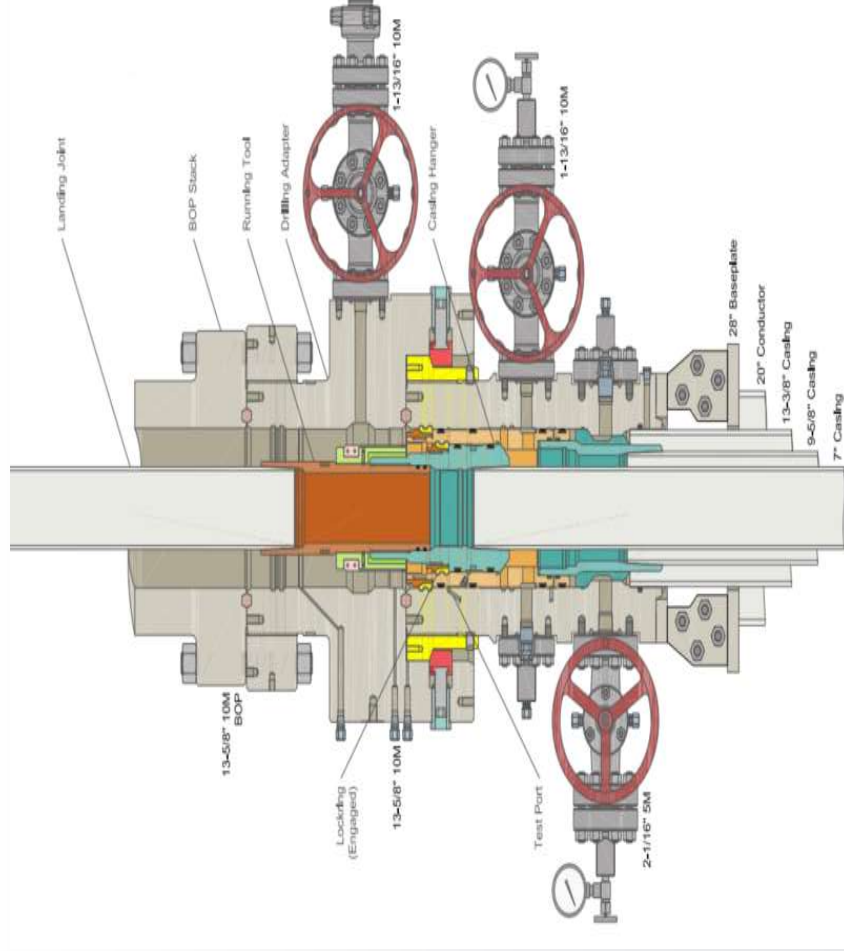


Offline Cementing -- Intermediate Casing



Offline Cementing Progression

- Run 7" casing
- Land 11" nominal x 7" hanger
- Test casing hanger
- Energize 11" nom x 7" hanger lock ring and pull test
- Re-test casing hanger
- Barriers & Procedures after landing casing before setting packoff
 - 10K BOP & 5K Annular-Internal and Annular barrier
 - Kill Weight Fluid in annulus and casing (ensure well is static before setting solid body packoff) Internal and Annular barrier
 - **If well is not static we WILL NOT set solid body packoff.**
 - 10K float collar-Internal Barrier
 - 10k float Shoe-Internal Barrier
- **After circulating a 1.5 casing capacities to ensure full column of mud and no entrained gas pumps will be shut off and floats checked for flow**

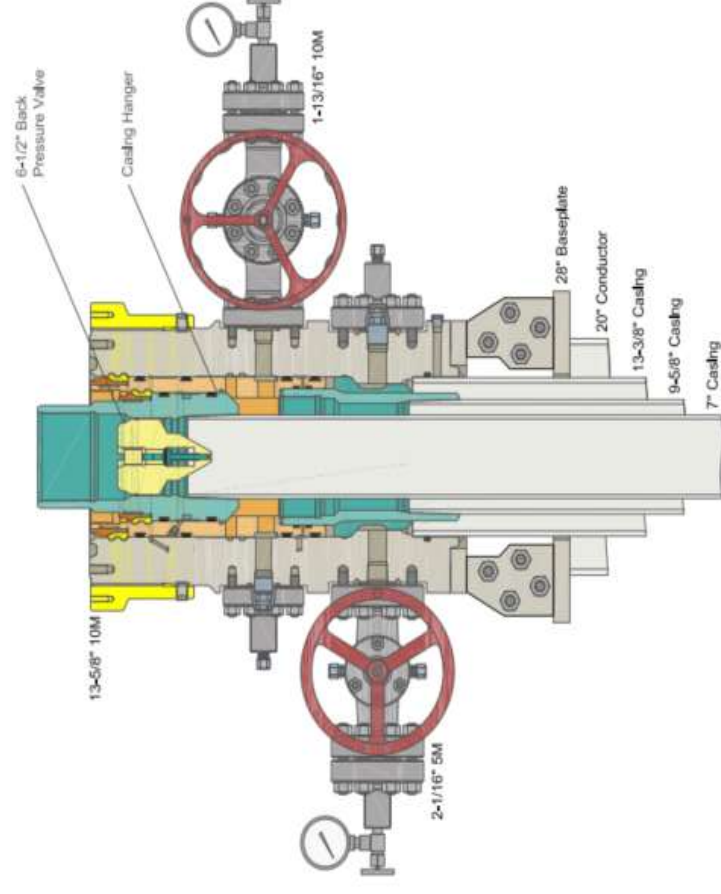


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SLIDE TITLE HERE | 9

Offline Cementing Progression

- Pick up running tool with 6-1/2" nominal Back Pressure valve run into well and set
- Barriers and procedures **BEFORE** removing BOP's
 - Kill weight Fluid in annulus-Annular Barrier
 - Solid Body Packoff-Annular Barrier
 - 10K Float Equipment-Internal Barrier
 - 10K Back pressure valve installed with BOP still on well-Internal Barrier
 - BPV will be tested before it arrives on location by Cactus

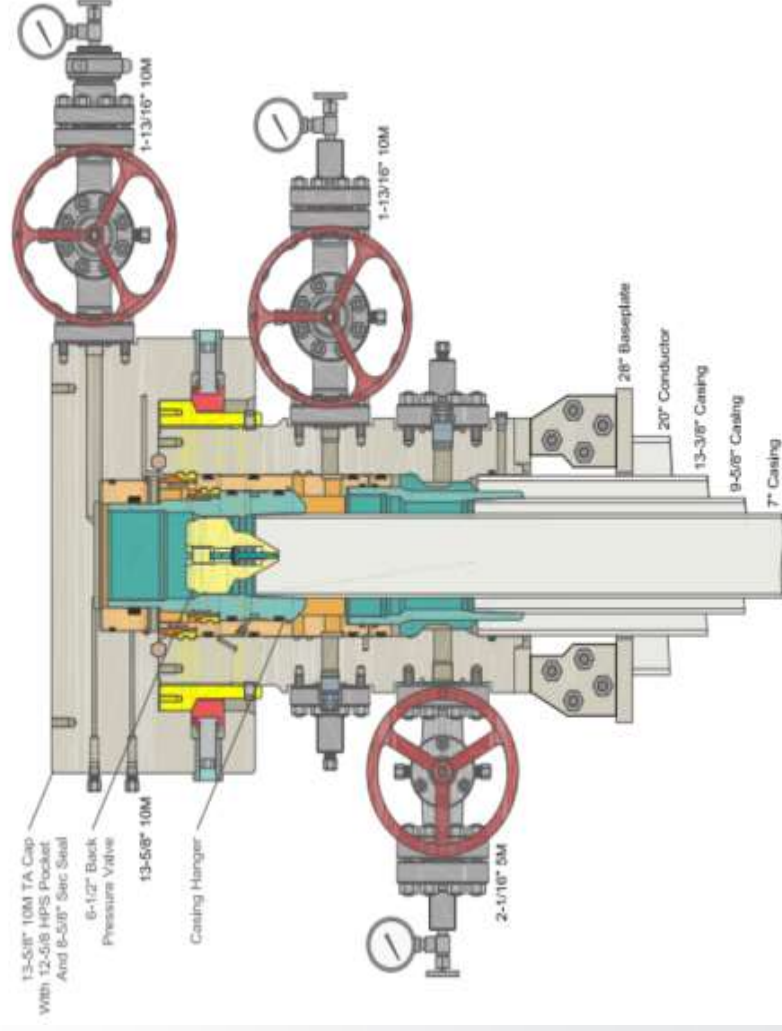


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SLIDE TITLE HERE | 10

Offline Cementing Progression

- Nipple down BOP
- Nipple up TA Cap and test
- Skid Drilling Rig
- Barriers and procedures **AFTER** removing BOP's
 - Kill weight Fluid in annulus-Annular Barrier
 - Solid Body Packoff-Annular Barrier
 - 10K Float Equipment-Internal Barrier
 - 10K Back pressure valve-Internal Barrier
 - 10K rated TA cap with Valve-Internal Barrier

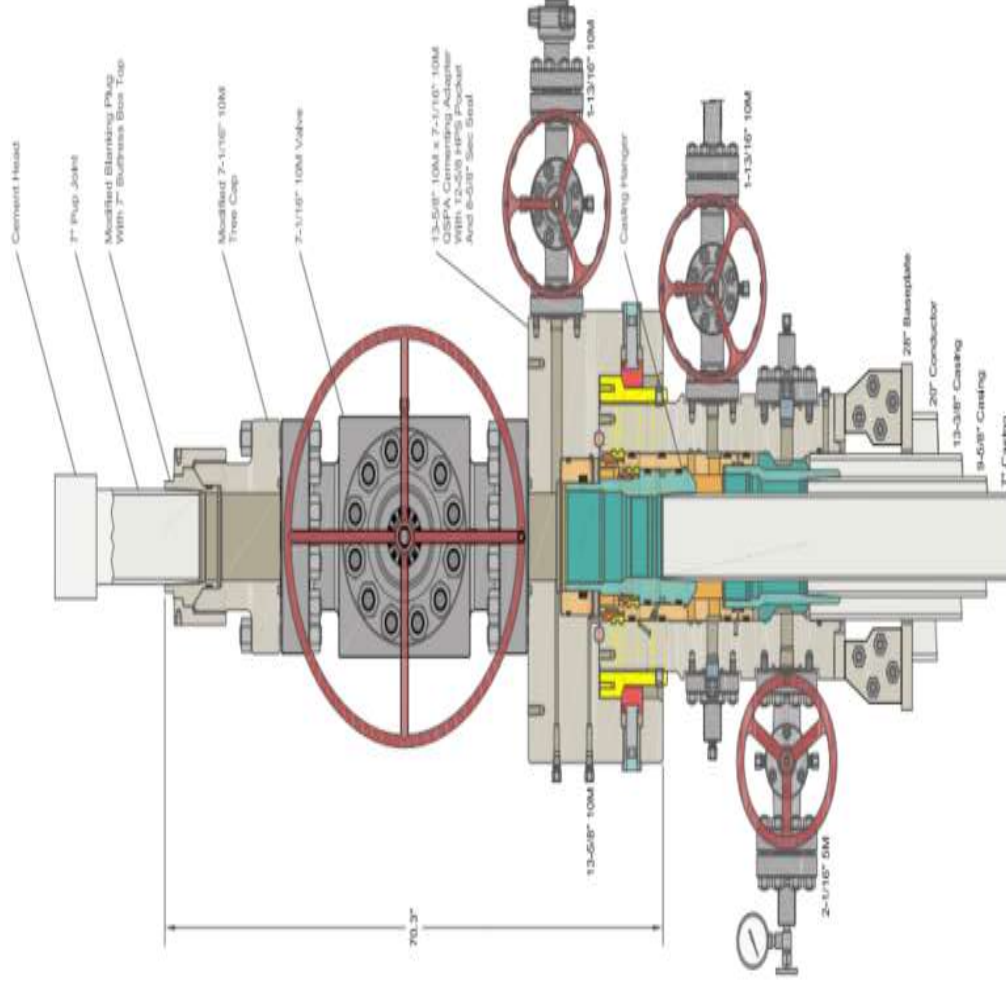


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Offline Cementing Progression

- Check Pressure on TA Cap and remove
- Install adaptor with Gate valve for off line cementing and test
- Rig up flowback iron independent of rig
- Retrieve Back Pressure Valve
- Shut in well
- Rig up to cement and pump job
- NU 10K TA cap after cement job
- Barriers and procedures before rigging up cementing equipment
 - Address well and ensure no pressure on TA cap
 - Ability to pump into well through casing valves on backside to kill if needed
- Kill weight Fluid in annulus-Annular barrier
- Solid Body Packoff-Annular barrier
- 10K Float Equipment-Internal Barrier
- 10K Back pressure valve-Internal Barrier



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Offline Cementing Risk and COA Compliance

- All testing and breaks tested in accordance with Onshore Order # 2 and COA's
- If no cement to surface, bradenhead squeeze still possible with offline cementing equipment
- Time from skid rig to offline cementing ops typically 24 hours
- **Conditions where we would not Offline Cement**
 - Well is flowing
- All wellhead equipment rated to 10K maintaining APD compliant
 - 10K flowback iron independent of rig circulating system
 - 10K Back Pressure Valve
 - 10K Gate Valve & TA combo for second barrier during operations
 - 10K 1-13/16 Valve coming off TA cap
 - 10K TA Cap



CIMAREX ENERGY CO. NYSE LISTED: XEC

SLIDE TITLE HERE | 13

District I
1625 N. French Dr., Hobbs, NM 88240
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District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 19631

CONDITIONS OF APPROVAL

Operator: CIMAREX ENERGY CO. 600 N. Marienfeld Street Suite 600 Midland, TX79701		OGRID: 215099	Action Number: 19631	Action Type: C-103A
OCD Reviewer pkautz		Condition None		